SEPTEMBER 23, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

How To Get More from Machine Tools

Opposite Page 118

- How To Be a Better Manager, Page 90
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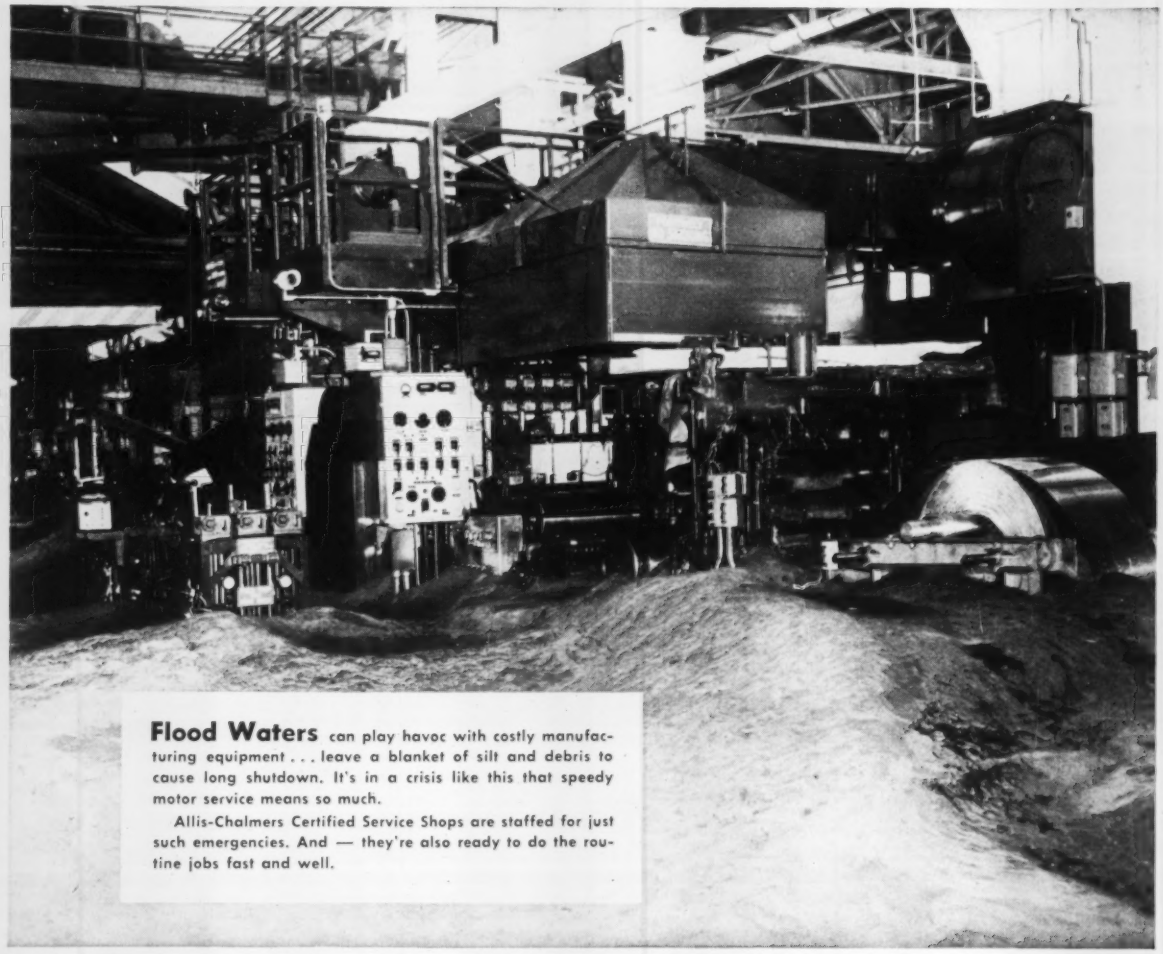
Allis-Chalmers "Certified" Service Shops:

When you need motor help



Flood Waters can play havoc with costly manufacturing equipment . . . leave a blanket of silt and debris to cause long shutdown. It's in a crisis like this that speedy motor service means so much.

Allis-Chalmers Certified Service Shops are staffed for just such emergencies. And — they're also ready to do the routine jobs fast and well.

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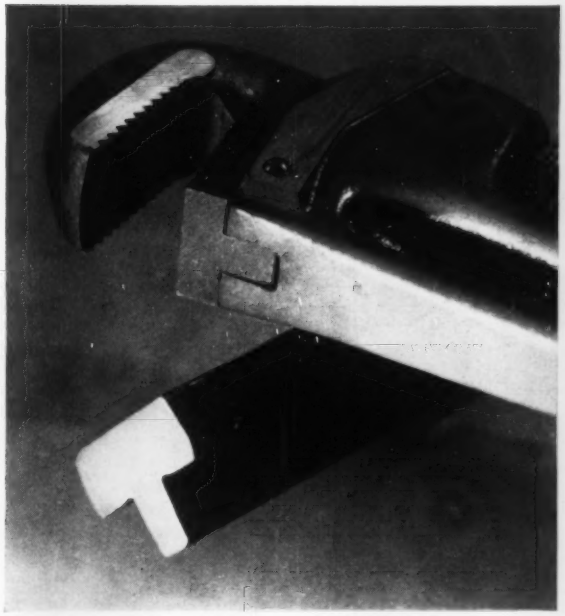
Whether it's complete catastrophe or a normal repair job, fast motor service can make a difference of thousands of dollars in lost production. As near as your phone is one of more than 100 Allis-Chalmers Certified Service Shops — ready to help save you production dollars.

These shops have manpower and equipment to perform repairs to Allis-Chalmers rigid standards. Their ability and integrity have been proven by years of service. They can do a good, fast job on any motor or generator, of any make. To locate the Shop in your area, call your nearby A-C district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

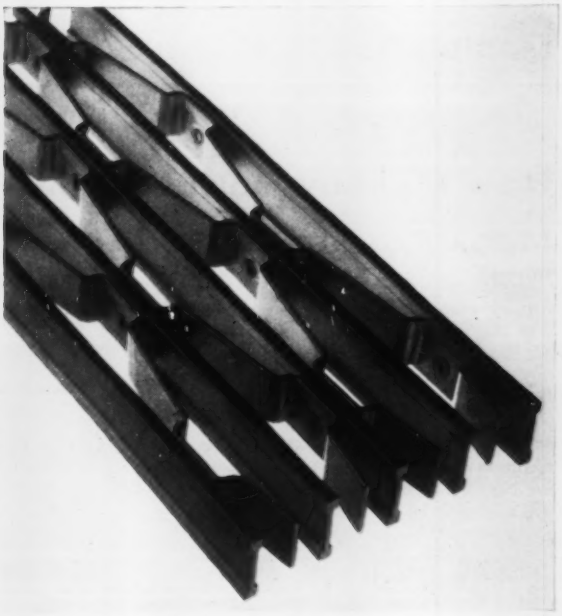
ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A-5300

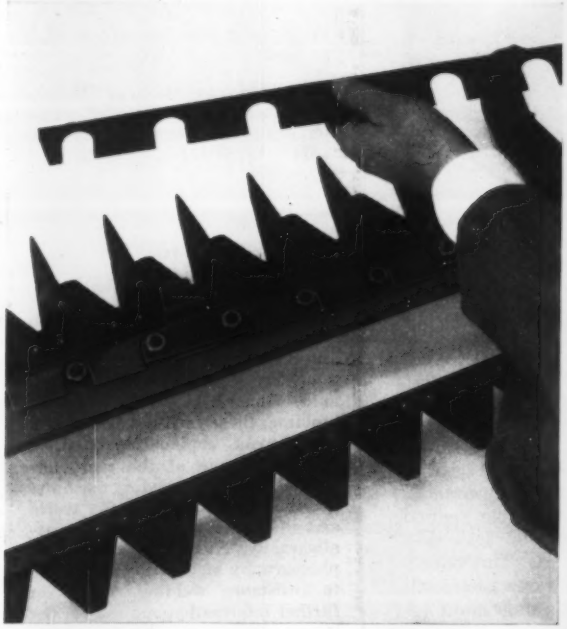


SLASHES COSTS—Heel-jaw T's for pipe wrenches made by an Ohio manufacturer were formerly forged alloy parts, individually machined. This was very costly. Now the customer uses rolled special sections. You can sometimes cut both material and processing costs by switching from individual forged parts to specially rolled bar lengths.



22 PCT STRONGER—Miniature I-beams, rolled by Bethlehem, are an important feature of a new type of welded floor grating. The Chicago manufacturer says ". . . these specially designed bars provide 22 pct more strength with 14 pct less weight than standard bars." Special sections allow you the flexibility to design a better product.

They do it better with special sections



BETTER CUTTERS—Two prominent midwestern manufacturers of mower equipment use Bethlehem-rolled sections for their cutter-bar wearing plates. They report that these sections make cutter bars more rigid, durable and easy to service. A *one-piece* section for the wearing plate is superior to a fabricated part. We also supply the knife-back steel.

• • • We urge you to consider the use of Bethlehem hot-rolled special sections. You may find ways to cut your costs and to improve your products. We'd be happy to work with you. Please contact the sales office nearest you.

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Resistance Welding Structural Members

SCIAKY

HELPS PUT PROFIT
INTO MANUFACTURING

How Massey-Harris-Ferguson Achieves Mass Production Economy on Short Runs

Among manufacturers whose production requirements for any given part are limited, resistance welding is often regarded as an impractical method of fastening. They agree it is fine for mass production where tooling costs and setup time can be spread out over tens of thousands of parts. But for them, the cost of tooling and fixturing anything but the simplest assemblies would be uneconomical.

The Cost Research Department of Massey-Harris-Ferguson, as part of a program to reduce manufacturing costs, undertook an investigation of resistance welding. Under the direction of Mr. E. E. Hart, the investigation emphatically proved the economy and dependability of the process for a wide range of limited production assemblies.

Simplification of setup is key

The Cost Research Department reasoned that the key to the entire problem depended entirely on minimizing setup time, complete simplification of tooling and fixturing and positive dependability and consistency of the fabricating method. Mr. Hart was convinced proper resistance welding techniques would satisfy all these requirements. Subsequent developments and testing proved him right.

How the problem was solved

Basic tooling and fixturing was built right into the welder. (See Figs. 1 and 2.) The various assemblies required only the simplest tooling. Individual tooling for any assembly seldom cost as much as $75 per welding setup.

Setup time for any assembly was reduced to an average of 30 minutes. The performance of the welders themselves was carefully studied and recorded. Machine control setup for any assembly was reduced to a simple matter of the briefest reference to graphs.

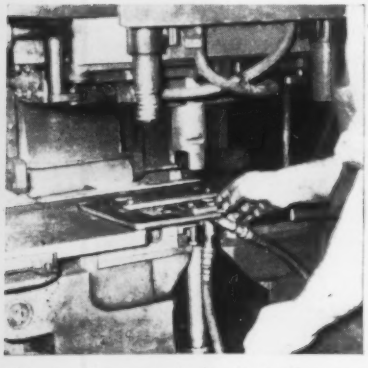

Fig. 1 Close-up of simple tooling required for a baler pick-up crank assembly.

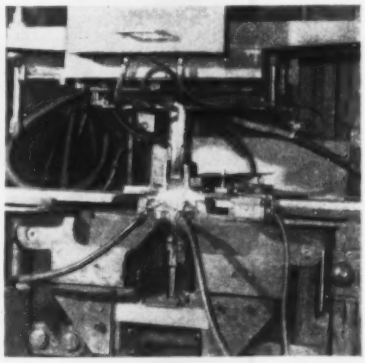

Fig. 2 Note universal fixturing table and simple dies used for welding a yoke assembly.

Cost reductions achieved

The large number of assemblies fabricated by resistance welding include many structural members. Castings, forgings and arc welded assemblies have been replaced with resistance welded assemblies of standard sheet or bar stock and screw machine products.

The cost of the resistance welded part averages 10 to 40% less than similar arc welded parts. The savings in time of the welding operation itself averages 60 to 90%. Castings and forgings suffer in comparison, with savings of over a dollar per unit not unusual.

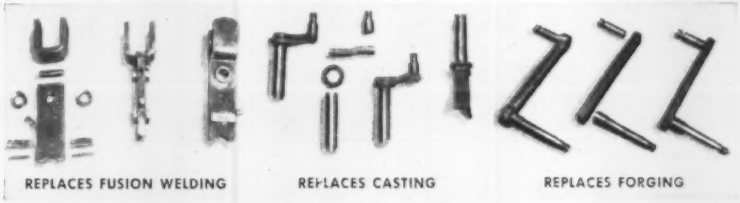

Fig. 3 Typical assemblies resistance welded on Sciaky equipment at M-H-F.

Quality welding essential

The success of such a program requires that the welders be capable of producing consistently high quality welds with maximum ease of control setup. Sciaky patented three phase welders easily meet these requirements.

Detailed information available

Two bulletins are available giving more complete information on the Massey-Harris-Ferguson program. "Resistance Welding at Work," Vol. 5, No. 1 (16 pages), gives data, including cost reductions, on 28 different M-H-F assemblies. An engineering report on "Design Standards" (48 pages) gives full technical data on the eight basic weld types employed. Copies of either or both bulletins are available on request.

Write today, mentioning the information you would like to receive. There is no obligation. Sciaky Bros., Inc., 4909 W. 67th St., Chicago 38, Ill. POrtsmouth 7-5600.

DO YOU HAVE A RESEARCH PROBLEM?

Facilities of the Sciaky Research Division at Los Angeles, California, are available for contract research to answer resistance welding problems. Housed in a 15,000 sq. ft. building, these facilities include an experienced engineering staff, a complete range of the most advanced resistance welding machines including the largest in the world and a laboratory equipped for metallography, chemistry, electronics, photography and testing as applied to resistance welding. Write for further information and ask for the 20 page Research Division brochure.

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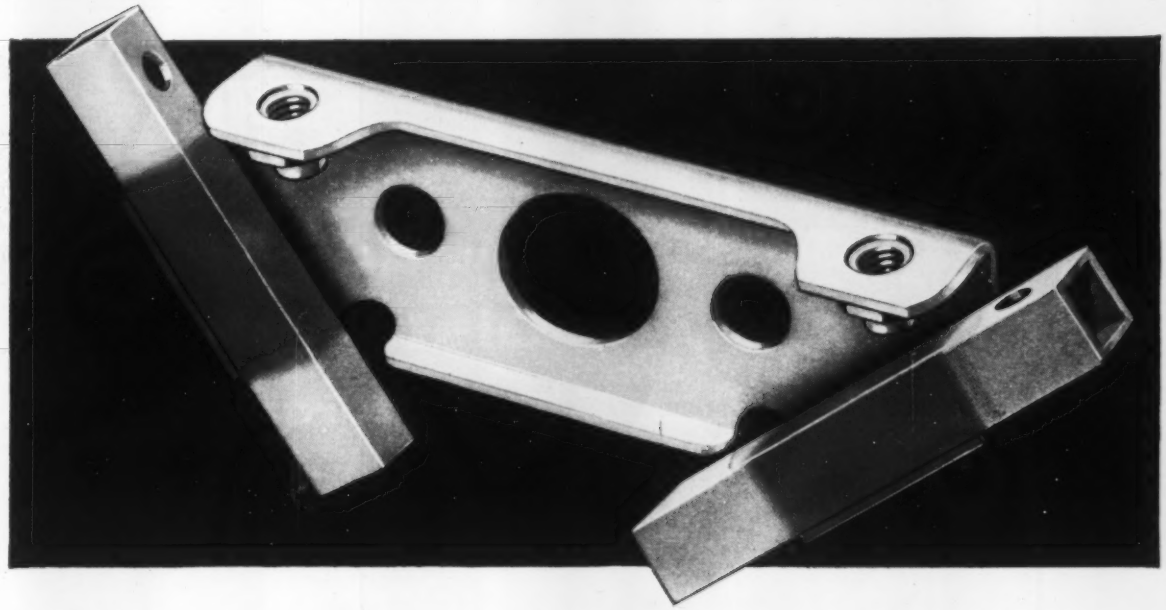

Brazing Costs Down—When Jack & Heintz engineers switched from torch brazing to automatic induction, brazing cost of these inverter brush mounts fell from $.05 to $.006 each—a reduction of 83% in direct labor costs alone! Additional savings result because less cleaning is required after TOCCO, and fuel costs are much lower, too.

Brazing Production Up—While costs dropped, production on the part zoomed—from 40 to 360 brazed assemblies per hour. Furthermore, rejects and scrap, formerly high, are now negligible.

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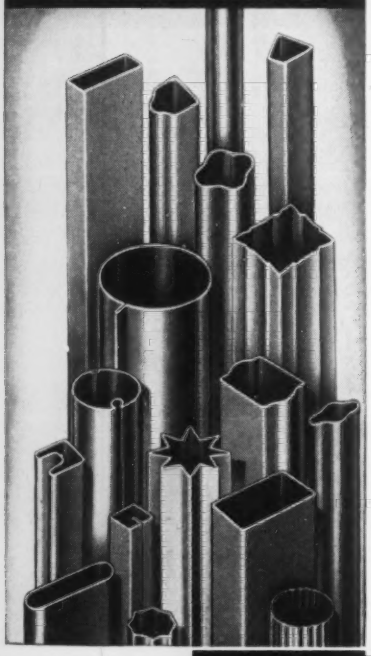
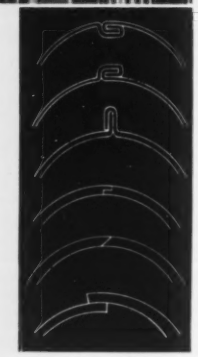
COLD ROLL FORMING TUBULAR SHAPES





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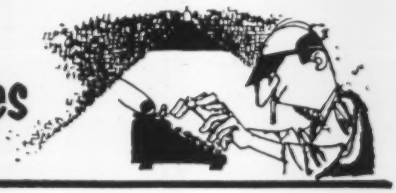
YODER ENGINEERING MANUFACTURING
COLD-ROLL FORMING MACHINES

behind the scenes



Full Color for STEEL

You're all familiar with such heart-shaking dramatic stuff as "a song is born," so we think it is only fair to assume that you don't give a hoot how a STEEL story is born. This is most unfortunate because we are employed to reveal what goes on behind the scenes in STEEL (short of material acceptable to *Confidential*, of course), and it is disturbing to address remarks at readers who have already thumbed past Page 6.

The story behind the story of the colored chips, the glowing front cover, and the four-color artwork illustrating methods for improving machining productivity (Page 119) began early this summer at the Monarch Machine Tool Co., Sidney, Ohio. Machine Tool Editor Robert Huber had called on Monarch's Al Albrecht, machining specialist, and while they were shooting the breeze, Bob wanted to know if anything could be learned from the shape of the chips. Al declared that a great deal could be learned from the shape of chips, their color, texture, size.

Three Men Co-operate

Huber and Albrecht went ahead with their experiments. Albrecht set up and photographed in color a whole series of chips. Their shapes were most significant. Huber then visited Dr. W. W. Gilbert, Mfg. Services Dept., General Electric Co., Schenectady, N. Y., and asked him what the colors revealed. Dr. Gilbert set up a machine, cut chips especially for the experiment, and made a set of color transparencies. By this time everybody was excited.

In the home office it was decided that the article should be tailored to management responsible for machining operations and that it should rate a color cover as well as four-color artwork. Huber came across a photo of a machine partly flooded by cutting fluid produced by the Johnson Wax people, so he wrote to Racine, Wis., and asked for the original photograph. R. A. Holmes, manager, industrial sales promotion, S. C. Johnson & Son Inc., kindly obliged. Mr. Holmes pointed out that their principal interest in the photograph was the lovely flood of Johnson's Wax-Cut that partially obscured it, and he hoped STEEL would mention this.

Incidentally, Wax-Cut is one of many lubricants Johnson has developed since 1947, when one of its salesmen stopped at a Brooklyn metalworking shop to investigate its "glue factory" smell. When he found that rancid beef tallow was being used in forming toothpaste tubes out of aluminum slugs, he recommended (and sold) Johnson's first application in metalworking. The liquid wax worked just dandy, even though it was originally designed to put a fine finish on furniture.

By the time Art Director Bill Kellogg assembled the photographs and copy, summer was in full bloom. Moreover, shortly after Bob Huber wrote the story, he went on vacation, and when Kellogg found he had more type than he had space, he felt surer than ever that he had entered the wrong business.

Printers Back Play

After all the planning, figuring, estimating, and scheduling, the material was turned over to the printers. STEEL had never run four-color process in its editorial pages before, and Carl Schafer manager of Penton Press, was obliged to spend much of his time soothing and reassuring the editors.

"It's simple," explained the urbane Mr. Schafer, exuding confidence at every pore. "You see, the article will be printed offset by another company, delivered to us in plenty of time, and we will bind it into STEEL. We will print the cover, but after it's varnished, you won't be able to tell it from an original colored photograph."

All this, if you please, simply to describe quickly and accurately how you may improve output from the machining equipment you now have. This is the first of a series in full color. Others (to be announced later) will follow. They will cover various phases of metalworking.

Shrdlu

(Metalworking Outlook—Page 73)

Do you know propane or natural gas can now be used for flame cutting without increasing oxygen consumption?

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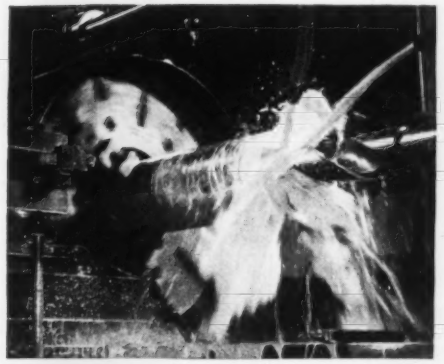
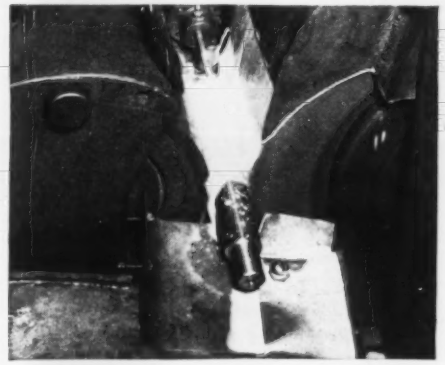
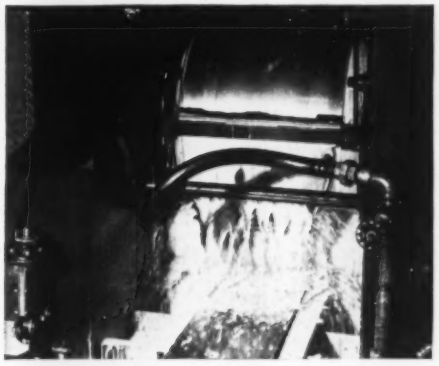


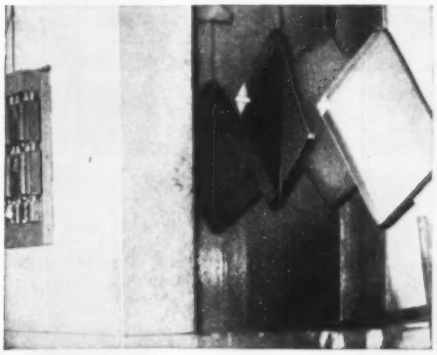
CUTTING



GRINDING



ROLLING



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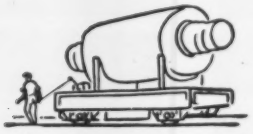

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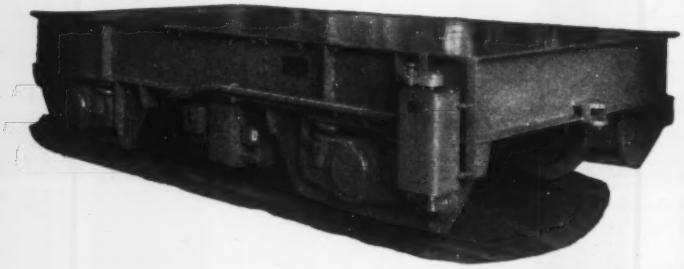

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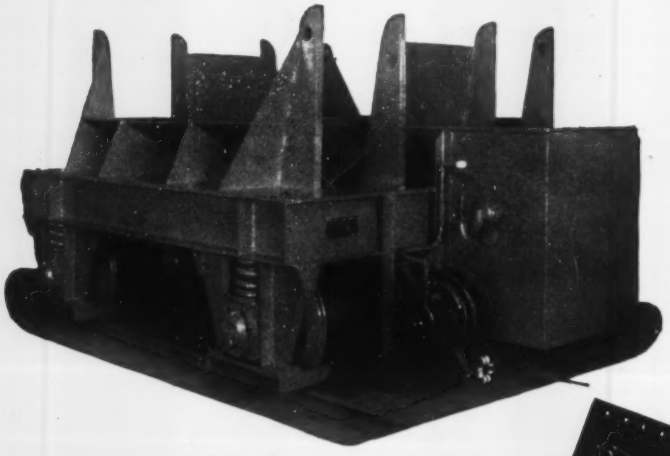

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LETTERS
TO THE EDITORS

Asset to Reading List

Being indebted to you already for sending tearsheets of your current Program for Management series, I have hesitated to write this letter.

We are establishing a technical information center and feel that tearsheets of your Production Ideas series would be an asset to our reading list, not only for present assistance, but future as well.

Anything we might say at this point would be redundant, but we read with great interest the entire magazine. We would like to see The Business Trend expanded and made available in tearsheet form.

We congratulate you on an excellent publication.

Dick E. Smith
Chief Mfg. Engineer
Union Malleable Mfg. Co.
Ashland, Ohio

Requests Corrosion Story

I will appreciate receiving two copies of your fine article, "New Ways To Fight Corrosion" (Part I, Aug. 26, Page 68, and Part II, Sept. 2, Page 158).

M. E. McHardy
Manager
Metals & Finishes Research
Hussman Refrigerator Co.
St. Louis

Letter of Appreciation

I would like to express my appreciation for the reprints of STEEL's 1957 Program for Management series. We have found them helpful in developing our own program. Congratulations to STEEL for the fine job it is doing.

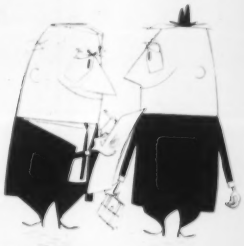
Joseph T. Flor
Supervisor of Training
Delco Appliance Div.
General Motors Corp.
Rochester, N. Y.

Enjoys Steelmaking Article

We enjoyed your article, "Chemical Capping Cuts Drawing Rejects" (Aug. 26, Page 76), and would like six copies.

J. D. Goodall
Assistant to the President
Northwestern Steel & Wire Co.
Sterling, Ill.

Thorough Poll of Industry

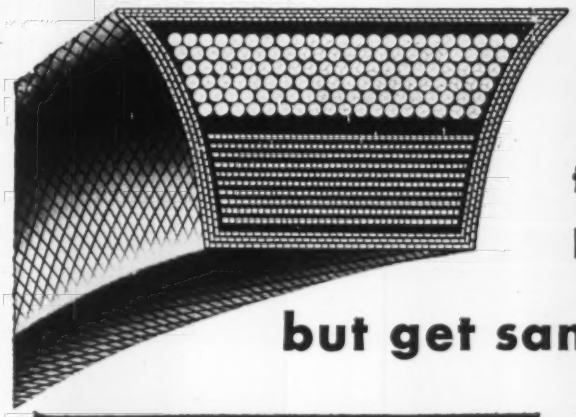


You have made a thorough poll of the appliance industry in your article, "Suppliers' Outlook Mixed" (Sept. 9, Page 63). I won't be surprised if your sales estimates prove accurate. Time will tell.

We would like to call attention to your statement: Dun & Bradstreet Inc., New York, says in 1940 there were 35

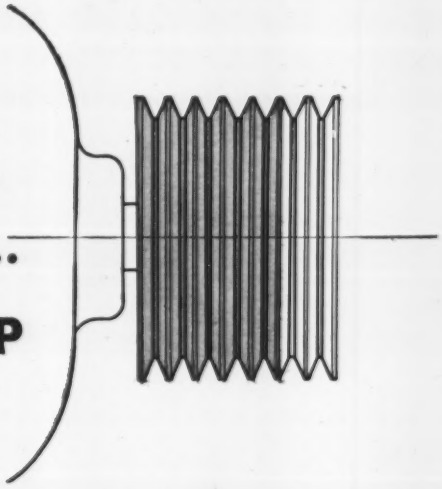
(Please turn to Page 12)

5 Gates Super Vulco Ropes do the work of 7 standard V-belts



Use fewer belts...

but get same HP



No other V-Belt has ALL these advantages

1. Flex-Weave Cover (U.S. Pat. 2519590)

A Gates exclusive: provides greater flexibility with far less stress on fabric. Cover wears longer . . . increases belt life . . . more power available to driven machine.

2. Concave Sidewalls (U.S. Pat. 1813698)

Concave sides (Fig. 1) increase belt life. As belt bends, concave sidewalls become straight, making uniform contact with sheave groove (Fig. 1-A). Uniform contact means less wear on sides of belt . . . far longer belt life.

3. Tough, resilient Tensile Cords

Super strong resilient tensile cords provide 40% greater horsepower capacity . . . easily absorb heavy shock loads . . . reduce number of belts required save weight and space.

4. High Electrical Conductivity

Built into Gates Super Vulco Ropes for safer drives (in explosive atmospheres).

5. Oil, Heat, Weather Resistant

Special rubber compounds make Super Vulco Ropes highly resistant to heat, oil, and prolonged exposure to weather.

Cut sheave width and weight . . . design your drive to benefit from the greater HP capacity of Gates Super Vulco Ropes.

5 Gates Super Vulco Ropes will do the work of 7 Standard V-Belts. A Super Vulco Rope Drive delivers more HP per dollar invested than any standard V-Belt drive.

Sheaves with fewer grooves cost less . . . weigh less . . . occupy less space. Your drive design is improved.

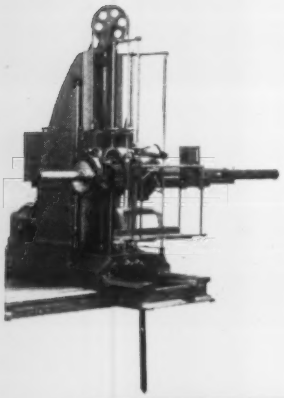
Helpful drive data is quickly available to you. Simply call your nearby Gates distributor for advice from a Gates V-Belt Specialist. Stocks carried in industrial centers throughout the world.

The Gates Rubber Company
Denver, Colorado

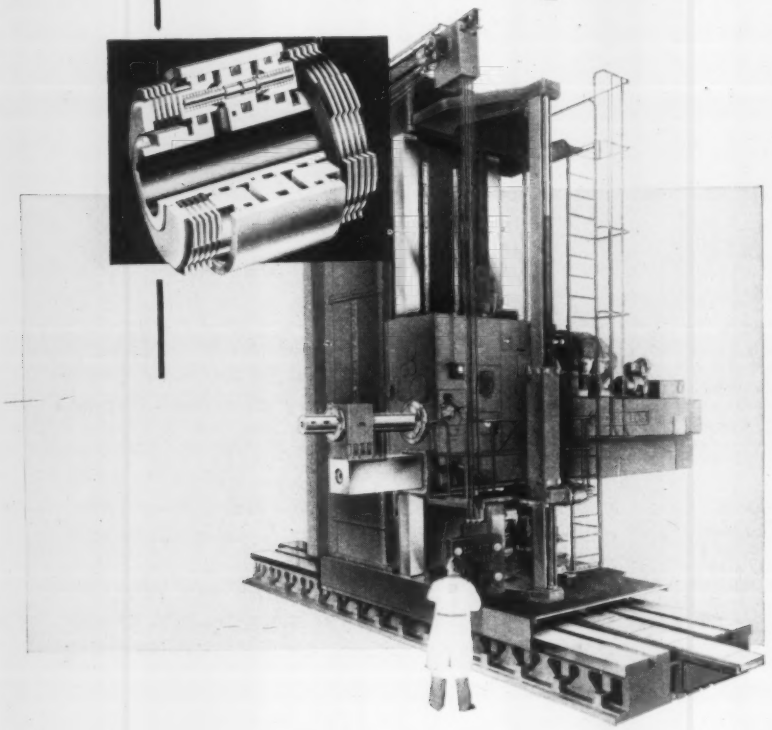
TPA 264

Gates — The Mark of *Specialized* Research

Gates Super VULCO ROPE Drives



only time proves the product... and its components



The small boring machine at top was built many, many years ago by Giddings & Lewis Machine Company, one of today's leading machine tool builders. It was still in widespread service when G & L first began using Twin Disc Friction Clutches. To picture this passing of time, compare G & L's modern 200-ton Model 1210-FUAR — the world's largest boring, drilling and milling machine!

G & L has used Twin Disc Clutches since the early trend toward today's high-production machine tools. The Model 1210-FUAR uses six Twin Disc oil-actuated, multiple-plate machine tool type clutches . . . and Twin Disc Clutches are used in many other G & L machine tool models.

Twin Disc Friction Clutches are currently available with capacities up to 1050 hp . . . Fluid Couplings to 850 hp . . . Three-Stage Torque Converters to 1000 hp . . . and Single-Stage Torque Converters to 212 hp. Write Twin Disc Clutch Company, Racine, Wisconsin; Hydraulic Division, Rockford, Illinois.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC

Friction Clutches and Fluid Drives

LETTERS

(Concluded from Page 10)

manufacturers of home laundry equipment; last year, the number had fallen to 17.

We can list 26, and it may be that we are not aware of one or two small regional manufacturers. This decrease can be attributed more to mergers within the industry than to business failures.

Robert W. Balcom
Associate Director
American Home Laundry
Manufacturers' Association
Chicago

Student Seeks Reprint

I have read your article, "Are Engineers Scarce?" (Sept. 2, Page 98). Being a junior mechanical engineering student at the University of Texas, I am much interested in procuring a copy.

Henry W. Lichte
3900 Wrightwood
Austin, Tex.

Query on Gold Dip Process

In your Technical Outlook of Sept. 2 (Page 129), you refer to a gold dip process called "Atomex." Please give us the name and address of its producer so that we can contact them.

Fred J. Kaim
Superior Plating Inc.
Minneapolis

• *Inquiries should be directed to Harold Robinson, Electrochemist, Baker & Co. Inc., 113 Astor St., Newark 2, N. J.*

Helpful to Personnel Men

Please send a copy of your fine article, "Make Your Labor Pact Work" (Aug. 19, Page 118), which we feel may be helpful.

O. D. McNitt
Personnel Manager
Pottstown Div.
Dana Corp.
Pottstown, Pa.

I would appreciate several copies. It was interesting and to the point.

R. A. Bauer
Personnel Manager
Stearns & Foster Co.
Cincinnati

Article Helps Researcher

Thank you for sending copies of the article, "Aluminum Looks Ahead" (Aug. 19, Page 107). It has been a great help in my current project.

Helen A. Taylor
Assistant to Research Director
D'Arcy Advertising Co.
New York

Original Data on Engineers

We consider your story, "Are Engineers Scarce?" (Sept. 2, Page 98), a fine article which logically presents the hoarding problem. Since it was based partially on our report, *Engineering Manpower*, we request that you mention the report has been published and its price.

George C. Hibben
Secretary
Engineering Management Reports
Cambridge, Mass.

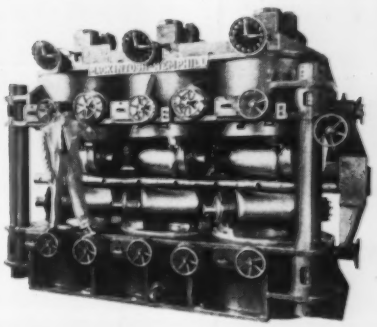
• *The report,* Engineering Manpower: How To Improve Its Productivity, *is published by Engineering Management Reports, P.O. Box 161, Cambridge 38, Mass. The price is $18.50 per copy.*

...ALL SIZES STRAIGHTENED AND PERFECTLY ROUNDED ON MACK-HEMP ROTARY TUBE STRAIGHTENERS

Tubes of any alloy in any O.D. from .050-inch to 16 inches are production straightened and rounded at speeds up to 800 feet per minute or better. The six driven rolls are fully adjustable to suit tube diameter, amount of straightening bend needed, and correct contact grip on the tube. The machine operates without speed-limiting, surface-marring guides and the finished tubing shows no spiral markings.

All models—from the smallest to the largest—are now available in Mack-Hemp's exclusive new three-post construction.

For complete details of Mack-Hemp straighteners, write today for a free copy of our 24-page Technical Bulletin No. 55-A, "How to Straighten Pipe and Tube".



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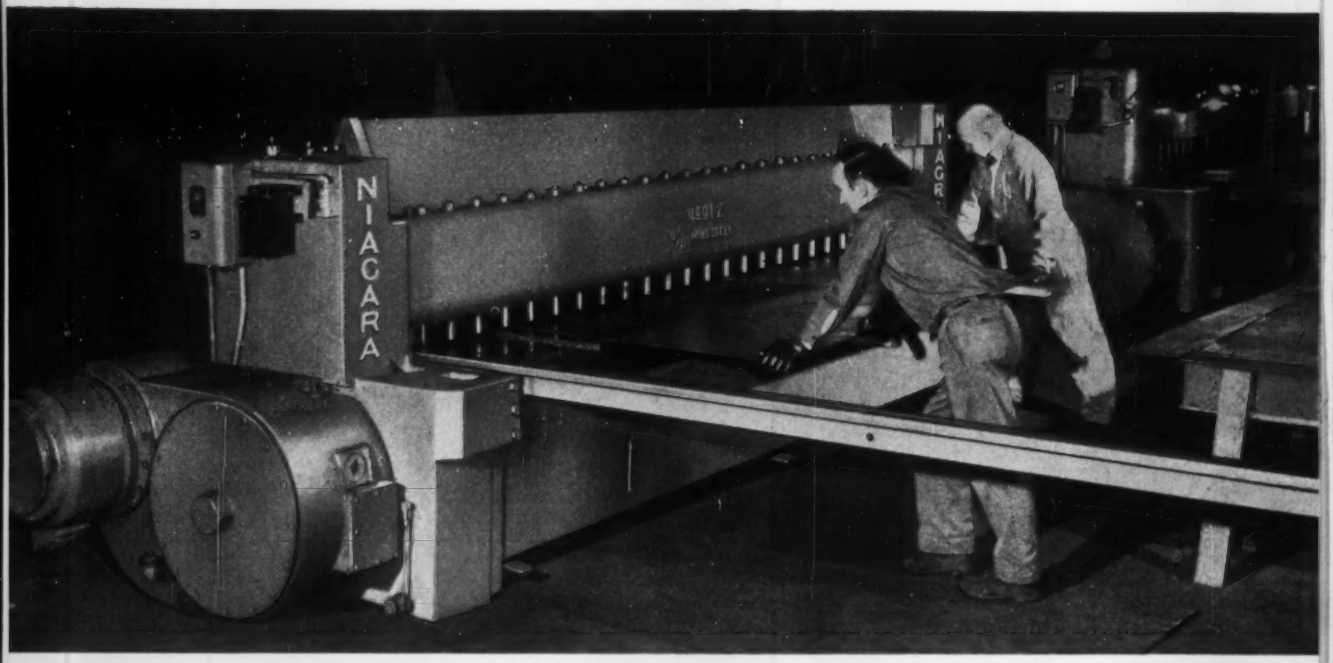
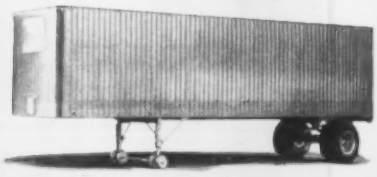
Makers of the rolls with the Striped Red Wabblers

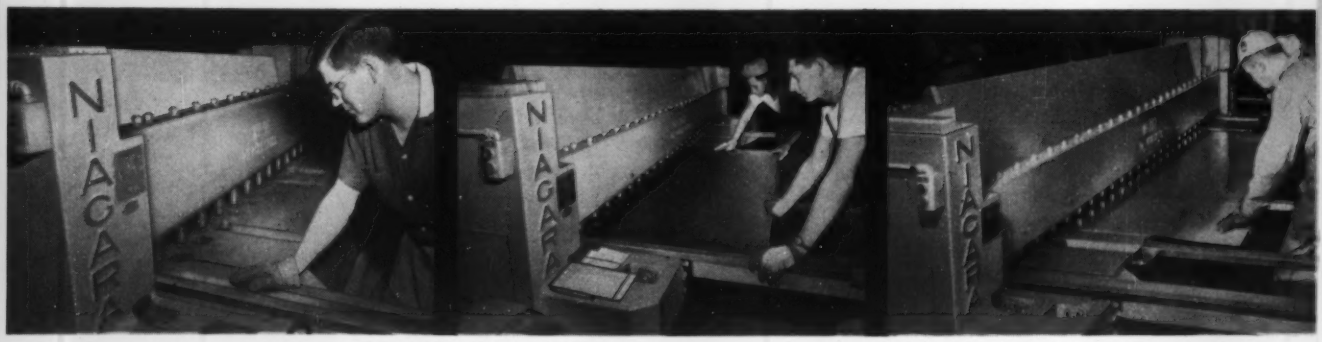
IN POWER SQUARING SHEARS...

Fruehauf picks Niagara for



Niagara Model 912 shearing 18" x 30" transition plates from 10 gage hot-rolled steel for tank trailer frames.





Niagara Model 96 cutting forty 4" x 6" trailer gussets per minute from 3/8" and 1/2" bar stock.

Niagara Model 812 shearing 11 gage hot-rolled steel to 36" x 144" for trailer floor beams.

Niagara Model 812 at work shearing 24 gage stainless steel to 4' x 6'6" for van trailer door panels. Production: 2.7 pieces sheared all 4 sides per minute.

NIAGARA power squaring shears

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

"exceptional machine value"

World's largest trailer manufacturer spells out its reasons for using Niagara Underdrive Shears in producing a wide variety of parts from cold-rolled and hot-rolled steels, stainless and aluminum

As a metal fabricator, Fruehauf Trailer Company is well-qualified to speak. It not only manufactures every conceivable type of commercial trailer, but "builds more of them than any company in the world."

So, when it comes to power squaring shears, Fruehauf is particularly qualified to speak. Using several Niagara Models, it considers them an "exceptional machine value."

Enlarging on the point, Fruehauf engineers say, "Niagara Shears are capable of holding straight lines within thousandths of an inch . . . they keep their settings . . . trouble-free, they require a minimum of maintenance.

"They're well-balanced . . . can be moved about . . . require no special concrete base. We especially like their minimum height . . . can see over them. It's unlikely that an operator will step out from the shear in the path of a fork lift."

Like Fruehauf, progressive companies everywhere look to Niagara for exceptional machine value in a power squaring shear. Here are a few of the reasons:

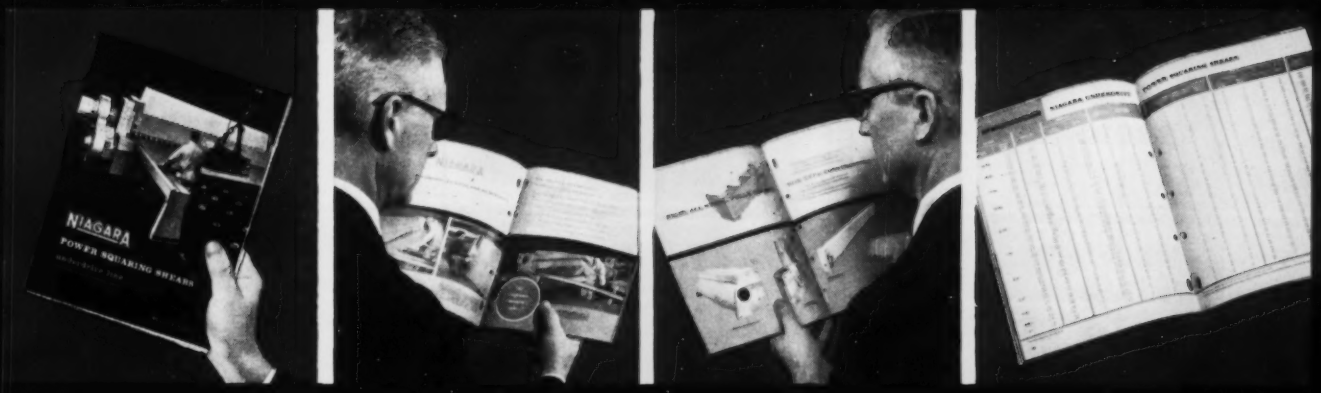
TAKE ACCURACY! Niagara's positive, power actuated, self-compensating holddown grips work securely. Fully closed box section construction of bed, crosshead, holddown and housings resists all stresses with minimum deflection.

TAKE SPEED! More working strokes per minute and instant engagement of Niagara's exclusive multi-point sleeve clutch assure more cuts per hour. Full visibility of the cutting line, ease of operation, quick setting gages and safety features boost hourly output.

TAKE MAINTENANCE! Niagara Shears are built to stand the gaff on the toughest jobs. Simplicity of design involving a minimum number of parts, and utmost accessibility cut out costly maintenance.

Any way you look at it, Niagara has the most to offer you in modern shear performance.

NIAGARA'S NEW, FACT-FILLED BULLETIN WILL GIVE YOU THE FULL STORY



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Highway building across the country
...is sped by an electric arc

All over the nation, you can see vast new roads being built. Rugged machines dig . . . scrape . . . haul . . . dump . . . to make your superhighway take shape.

Producing road-building machines involves special problems for their makers. Here, LINDE lends a hand. With UNIONARC welding equipment, heavy steel sections are joined with joint areas stronger than the steel itself.

Each of LINDE's different welding methods is designed for certain types of jobs. One is for joining metals that ordinarily are difficult to weld. Another gives sound seams in very thick steel. UNIONARC welding, a method recently developed by LINDE, permits welding downhand, vertically, or overhead—with savings up to 50%.

For half a century, LINDE has been engaged in research, development, and production of welding machines and methods, for both gas and electric operation. For information on UNIONARC, and a copy of the booklet, "Modern Methods of Joining Metals," write or call your nearest LINDE office.

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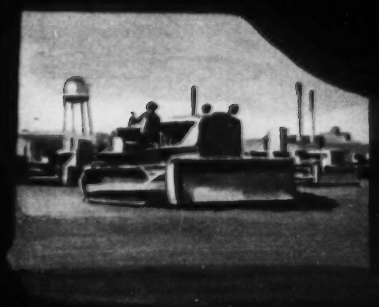

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TRADE MARK

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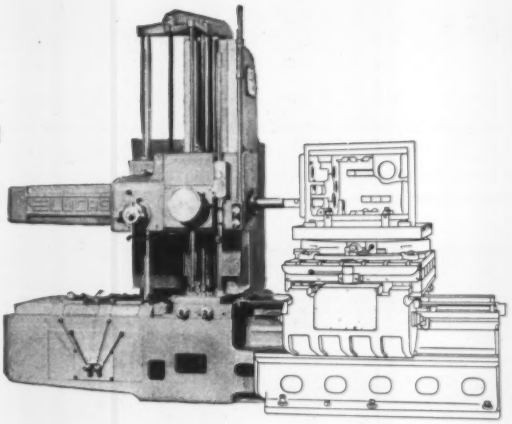
Electric arc welding methods developed by LINDE are used to help make tough and durable road-building machines for building the nation's highways.

Select a Lucas

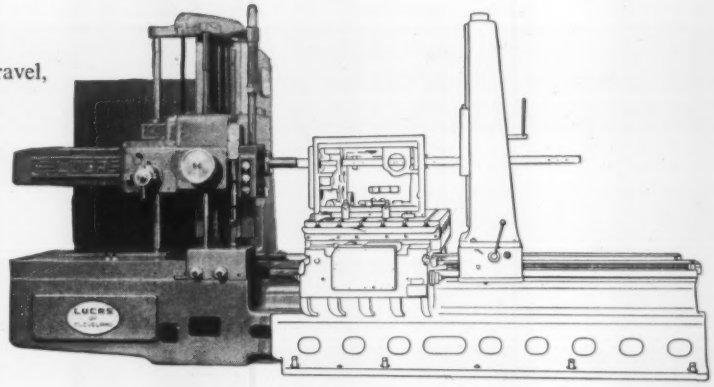
- **for accurate spacing**
- **for precision boring**
- **for heavy milling**

Your choice of controls—

STANDARD LEVER CONTROLS
available for use with both short bed or backrest models.



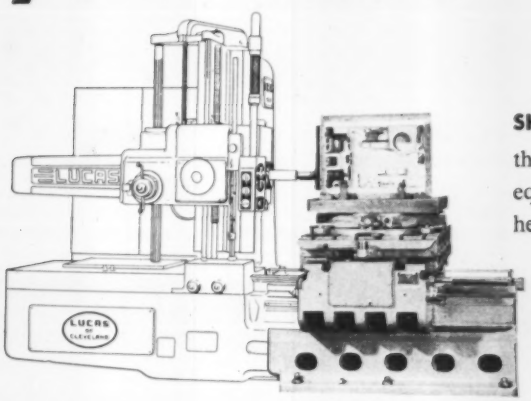
FULL PENDANT CONTROL
of feeds, speeds and directional travel, optional on any Lucas.



Whether you do line or stub boring, whether you prefer lever or automatic pendant control, you get the basic advantages of automatic power positioning and 4-way beds. Whichever model you select you get the benefit of continuing design improvement, backed by 57 years of specialization and leadership in this field *plus* the full resources of The New Britain Machine Company.

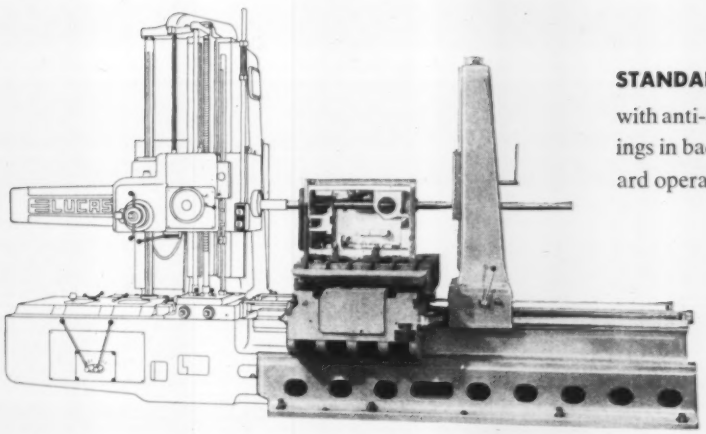
in production
in the tool room
in experimental work
in engineering research
in maintenance applications
or several, in combination

your choice of beds



SHORT BED MODELS

the most compact and economical equipment for precision stub boring, heavy milling and horizontal drilling.



STANDARD BED WITH BACKREST

with anti-friction bearing mounted bushings in backrest block, handles all standard operations including line boring.

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1. Superior mechanical properties to meet exacting design requirements
2. Uniform soundness—free from harmful inclusions and porosity
3. Highest quality—to insure long, dependable, trouble-free service
4. Job-ready castings—machined to your exact specifications

More and more design engineers are realizing that new applications for centrifugal castings are *unlimited* . . . thanks to new knowledge about alloys . . . new casting and machining techniques and facilities.

From simple bushings to atomic reactor components . . . from bronzes to heat, corrosion, and abrasion resistant stainless steels . . . from 7″ to 54″ O.D. and lengths to 33 ft.—Sandusky centrifugal castings are providing gratifying results in scores of applications, many unheard of a few years ago.

What cylindrical or piping problem can we help you solve? . . . Code pressure vessels? . . . Reactor vessels? . . . Power Piping? . . . What is your problem?

Your inquiry will bring more information promptly . . . or, if you prefer, a personal call by one of our engineers.

See our Display in Booth No. 1731 at the METAL SHOW

CENTRIFUGAL CASTINGS

Sandusky Foundry & Machine Company

SANDUSKY, OHIO • Stainless, Carbon, Low Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

CALENDAR
OF MEETINGS

Sept. 23-25, American Society of Mechanical Engineers: Fall meeting, Hotel Statler, Hartford, Conn. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Sept. 23-26, Association of Iron & Steel Engineers: Annual convention, Penn Sheraton Hotel, Pittsburgh. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Sept. 26-27, American Hot Dip Galvanizers Association Inc.: Semiannual meeting, Netherland-Hilton Hotel, Cincinnati. Association's address: 1806 First National Bank Bldg., Pittsburgh 22, Pa. Secretary: Stuart J. Swensson.

Sept. 29-Oct. 3, National Screw Machine Products Association: Fall membership meeting, Broadmoor Hotel, Colorado Springs, Colo. Association's address: 2860 E. 130th St., Cleveland 20, Ohio. Executive vice president: Orrin B. Werntz.

Sept. 29-Oct. 2, Packaging Machinery Manufacturers Institute: Annual meeting, Cloisters, Sea Island, Ga. Institute's address: 342 Madison Ave., New York 17, N. Y. Executive director: Russell L. Sears.

Sept. 30-Oct. 1, Material Handling Institute Inc.: Joint industry fall meetings, Greenbriar, White Sulphur Springs, W. Va. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Oct. 1-5, Society of Automotive Engineers: Aeronautic meeting, aircraft production forum and aircraft engineering display, Ambassador Hotel, Los Angeles. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Oct. 3-4, Refractories Institute: Fall meeting, Grand Hotel, Point Clear, Ala. Institute's address: 1801 First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: Avery C. Newton.

Oct. 3-5, Porcelain Enamel Institute: Annual meeting, Greenbriar Hotel, White Sulphur Springs, W. Va. Institute's address: 1145 19th St. N.W., Washington 6, D. C. Secretary: John C. Oliver.

Oct. 4-5, American Ceramic Society Inc.: Refractories Division meeting, Bedford Springs Hotel, Bedford, Pa. Society's address: 4055 N. High St., Columbus, Ohio. Secretary: Charles S. Pearce.

Oct. 6-10, Electrochemical Society Inc.: Fall meeting, Hotel Statler, Buffalo. Society's address: 216 W. 102nd St., New York 25, N. Y. Secretary: Henry B. Linford.

Oct. 6-11, American Trucking Associations Inc.: Annual meeting, Conrad Hilton Hotel, Chicago. Associations' address: 1424 16th St. N. W., Washington 6, D. C. General manager: Ray G. Atherton.

Oct. 7-9, American Society of Lubrication Engineers and American Society of Mechanical Engineers: Joint lubrication conference, Royal York Hotel, Toronto, Ont. Information: 84 E. Randolph St., Chicago 1, Ill. Administrative secretary: William P. Youngclaus.

Oct. 7-9, National Electronics Conference Inc.: Annual meeting and show, Sherman Hotel, Chicago. Conference's address: 84 E. Randolph St., Chicago 1, Ill. Executive secretary: J. S. Powers.

Oct. 7-10, American Institute of Steel Construction Inc.: Annual meeting, Del Coronado Hotel, Coronado, Calif. Institute's address: 101 Park Ave., New York 17, N. Y. Executive vice president: L. Abbett Post.

Oct. 7-11, American Institute of Electrical Engineers: Fall general meeting, Morrison Hotel, Chicago. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

"POP"® RIVETS

can probably save you money . . .

Even if your present fasteners are free!

Greater Design Flexibility
No need for access to both sides.

High Clinching Action
Exerts as high as 600 pounds squeeze between parts.

Wide Grip Range
Same length "POP" Rivet holds tight through thick or thin.

Vibration Proof
"POP" Rivets cannot back out or become loose. No lock washers or nuts required.

Low Head Profile
Where space is important, "POP" Rivets' minimum head height is the answer.

Less Critical Hole Diameter
Designer wants holes tight, production wants holes larger. "POP" Rivets make both happy.

Least Back-Up Space
Strong, high grip "POP" Rivets need only enough back-up space to provide room for set head.

When buying fasteners, do you figure the *installed costs?* A fastener considered alone may cost very little but be very expensive by the time it's installed and becomes part of a finished product.

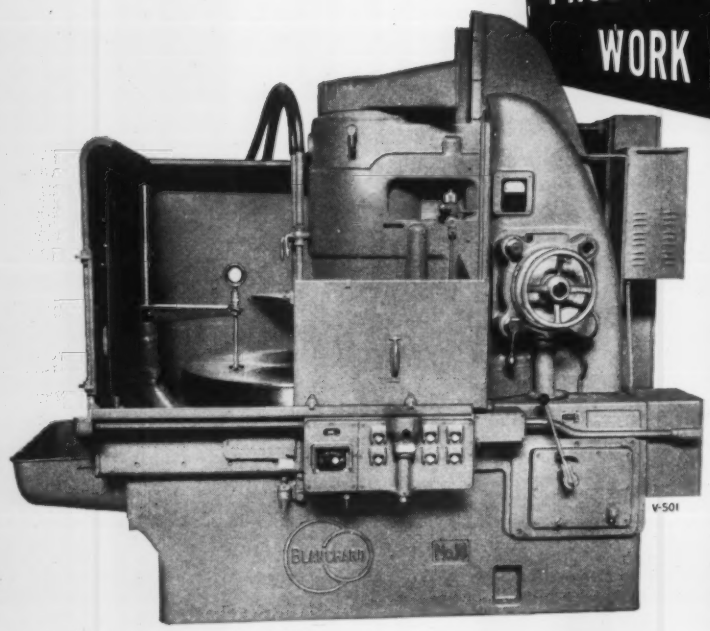
"POP" Rivets afford greater flexibility in product design. Often operations can be eliminated, assembly costs reduced, and speed of fastening increased.

Many users find high strength "POP" Rivets the most efficient and economical fastener for their product. Investigate its use in your application. Perhaps you too can enjoy the many advantages "POP" Rivets have to offer. Write us today.

"POP" RIVET
DIVISION
UNITED SHOE MACHINERY CORPORATION
West Medway, Mass.

for BEST results in surface grinding...

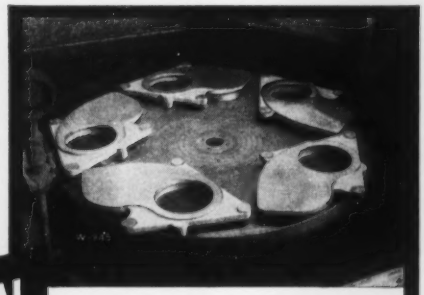
PUT IT ON THE BLANCHARD



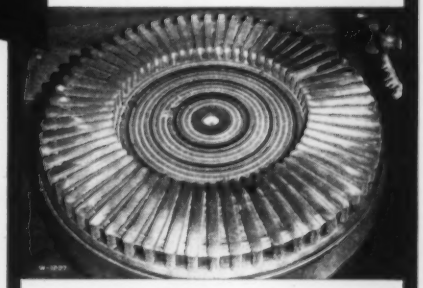
Blanchard Grinders are used throughout industry on surface grinding jobs that demand the utmost in production, finish and accuracy.

Whatever *you're* surface grinding, there's a Blanchard designed to do the job speedily and accurately.

PRODUCTION WORK

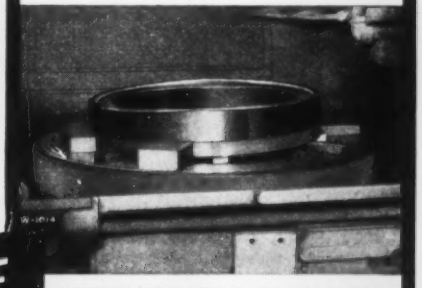


SIDE PLATES. 9" x 18" plates ground from rough on No. 18 Blanchard with 36" chuck. Stock removal 1/16" to 1/8" per side. Held flat within .003", parallel to .001", and to dimension tolerance of ±.001". Production: 30 surfaces per hour.



CONNECTING LEVERS. Cast iron levers ground in special magnetic fixture with pins located in "vee's". Stock removal per side is 1/32" to 1/16"; must be flat and at right angles to pins. No. 18 production: 180 pieces per hour, compared to 20 pieces per hour by former method used.

MAINTENANCE AND ODD LOT WORK



HARDENED STEEL PUNCHES. This 24-13/16" dia. punch, reground on a No. 18, is centered radially on 36" magnetic chuck. Duplicate circumferential and radial shear reliefs are generated with two setups.

GRANITE SURFACE PLATES. A No. 18 Blanchard reconditions this 18" x 34" granite surface plate by grinding it flat within .0002". 3/16" of stock is removed in 5 hours.

PUT IT ON THE **BLANCHARD**

Send for free copies of "Work done on the Blanchard", fifth edition, and "The Art of Blanchard Surface Grinding".

THE BLANCHARD MACHINE COMPANY
64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

A NEW STANDARD IN CUTTING PERFORMANCE

LADISH

Controlled Quality

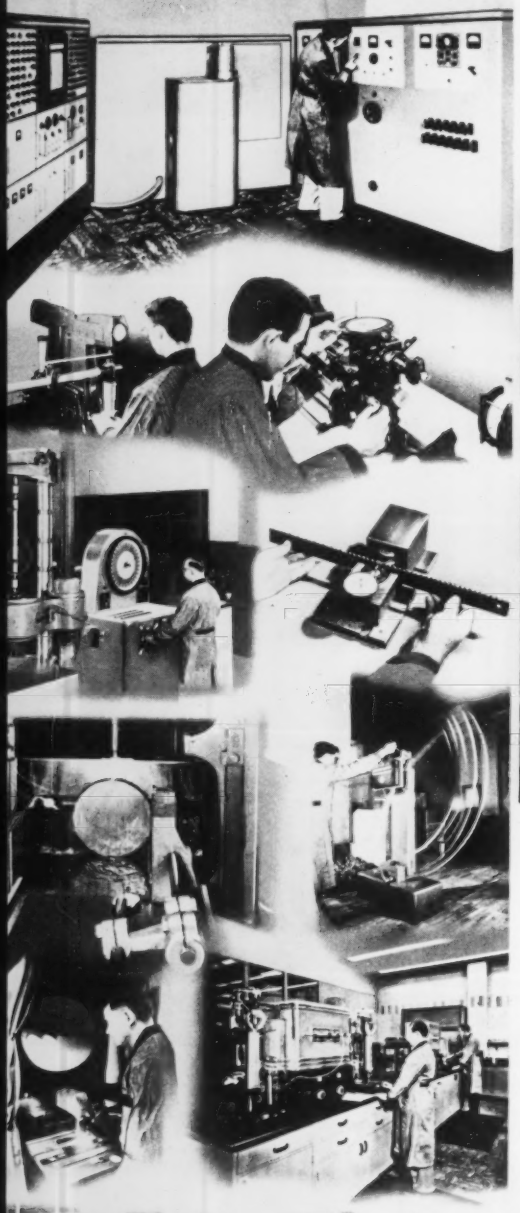
HIGH-SPEED STEEL

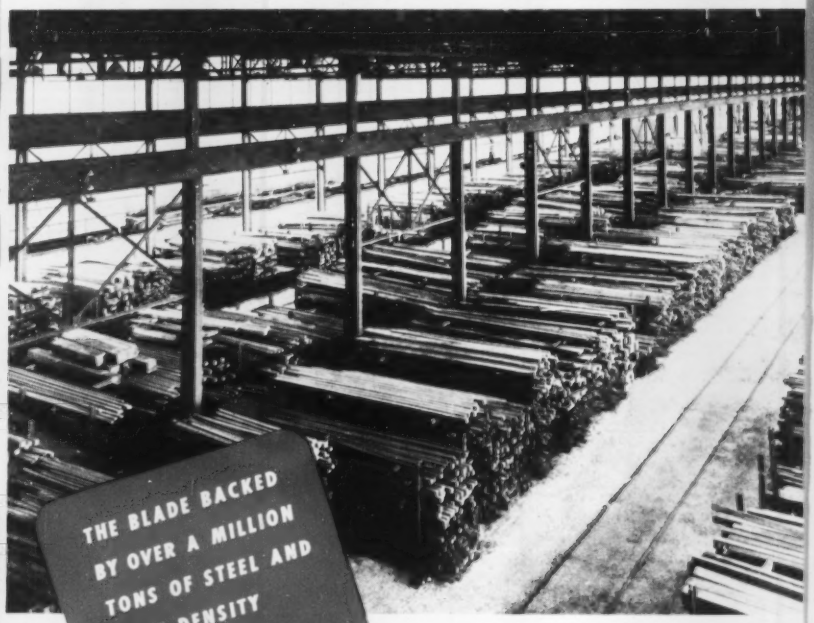
POWER HACK SAW BLADES

TO MARK PROGRESS

- *Developed and manufactured by one of the largest users of power hack saw blades.*
- *Unsurpassed metallurgical and manufacturing controls assure cutting performance.*

LADISH





THE BLADE BACKED BY OVER A MILLION TONS OF STEEL AND HIGH DENSITY ALLOY SAWING EXPERIENCE

Through every phase of production . . . from receipt of Ladish special blade quality material to packaging for shipment . . . exacting manufacturing controls and scientific laboratory procedures safeguard uniformity in quality, cutting performance and metallurgical integrity of every Ladish blade.

THE ONE BLADE THAT GIVES EXTRA PROTECTION OF HEAT CODE IDENTITY

Each mill heat of steel used in the manufacture of Ladish blades is subjected to exhaustive chemical analyses and physical tests to verify compliance with the high standards of Ladish specifications. A heat code symbol is then assigned to identify this material through all phases of production.

The distinctive heat code symbol on each Ladish blade is the key to its metallurgical integrity . . . another added assurance of dependable performance.

OUTSTANDING PERFORMANCE *Certified by* **LADISH**

UNEQUALLED METALLURGICAL AND MANUFACTURING CONTROLS

Controlled Quality

POWER HACK SAW BLADES... *a significant advance in cutting metals*

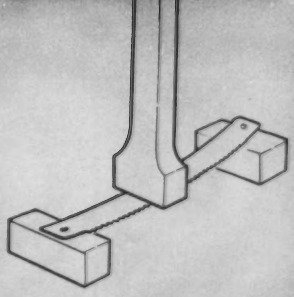
Now, after years of exhaustive production testing, Ladish, one of the largest users of power hack saw blades, announces the development and manufacture of Ladish Controlled Quality power hack saw blades... blades that in long range, exhaustive tests have earned significant recognition as... *a new standard in cutting performance.*

This blade development is a direct result of valuable performance data tabulated in the process of cutting over a million tons of steel in a wide variety of sizes, shapes and material specifications including stainless steels, alloy steels, titanium and high density heat-resisting materials.

With this vast experience Ladish engineers designed, developed and tested a blade with the necessary qualifications to provide assurance of long, trouble-free service in making fast, straight cuts.

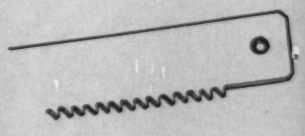
BALANCED HARDNESS AND TOUGHNESS ASSURE MAXIMUM SERVICE

Ladish heat treating techniques, selection of blade stock and manufacturing processes provide proper balance of toughness and hardness to give long life, rapid and straight cutting.



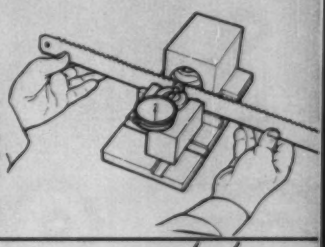
TOUGH PIN HOLE AREA RESISTS WEAR AND BREAKAGE AT CRITICAL LOCATION

Tough pin hole area... increases resistance to breakage. Each blade individually Rockwelled for conformity to specified hardness rating.



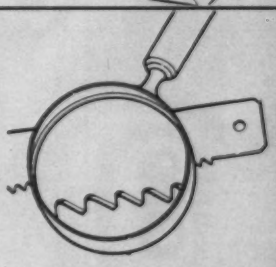
PRECISION MILLED AND SET CUTTING TEETH

Special machine tools, designed and produced by Ladish, precision mill teeth to honed sharpness. Teeth set to consistent uniform gage measure.



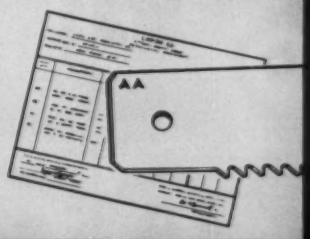
SCIENTIFIC TOOTH PROFILE CLEARS CHIPS, PREVENTS CLOGGING

Radius in tooth design permits chips to pass freely without causing clogging and binding of blade in cut.



METAL QUALITY CERTIFIED BY SCIENTIFIC LABORATORY TESTS

Each blade bears heat code symbol of its metallurgical integrity.



SUSTAINED HIGH CUTTING PERFORMANCE

LONG, DEPENDABLE BLADE LIFE

MORE CUTS PER DOLLAR

You Can Depend on **LADISH** *Performance Tested Blades*

Prove **TO YOURSELF THE ADDED LIFE AND CUTTING EFFICIENCY OF LADISH BLADES**

Use this coupon to arrange for a consultation with a Ladish Service Engineer.

LADISH CO., CUDAHY, WIS.

I am interested in making a personal appraisal of Ladish blades. Have Service Engineer call.

NAME

TITLE

COMPANY

STREET ADDRESS

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TO MARK PROGRESS

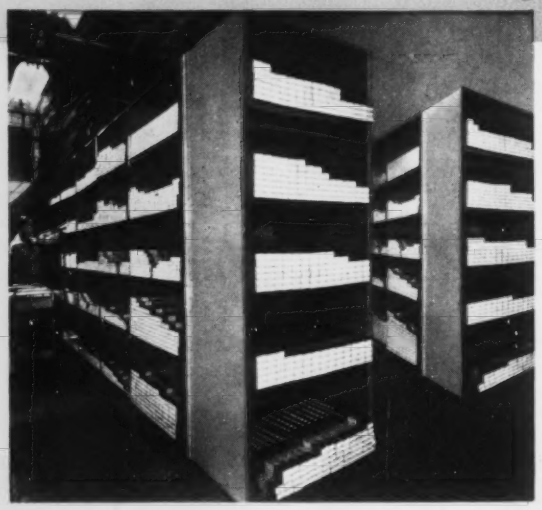
LADISH CO.

CUDAHY (Milwaukee Suburb) WISCONSIN

SALES OFFICES: Amarillo • Atlanta • Baton Rouge • Buffalo Charlotte • Chicago • Cleveland • Denver • Havana • Houston Los Angeles • Mexico City • New York • Odessa • Philadelphia Pittsburgh • St. Louis • St. Paul • San Francisco • Seattle • Tulsa

PIPE FITTINGS | DROP FORGINGS | ROLLED RINGS | POWER HACK SAW BLADES

LADISH *Controlled Quality* POWER HACK SAW BLADES



AMPLE STOCKS ASSURE PROMPT DELIVERY

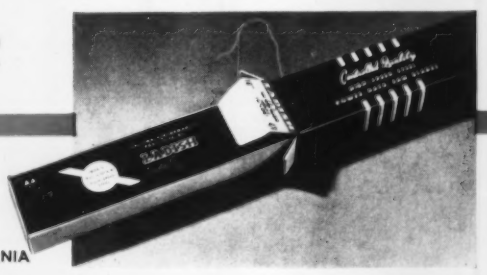
An increasing number of distributors are carrying ample stocks of Ladish blades to meet normal demands.

Unusual requirements can be quickly obtained from the large inventories maintained in the centrally located Ladish plant.

LADISH HIGH-SPEED STEEL BLADE SPECIFICATIONS

NOMINAL SIZE	PIN HOLE DIAMETER	HOLE-TO-HOLE LENGTH	WIDTH	THICKNESS	PART NUMBERS FOR BLADES WITH TEETH PER INCH AS LISTED					WEIGHT IN LBS. PER 100 BLADES
					3 TEETH	4 TEETH	6 TEETH	10 TEETH	14 TEETH	
12	9/32	11 7/8	1	.050	...	...	...	1210-5	1214-5	19.2
14	9/32	13 1/2	1	.050	...	...	...	1410-5	1414-5	21.6
			1 1/4	.062	...	...	1406-6	1410-6	...	34.0
			1 1/2	.075	1403-7	1404-7	1406-7	...	...	48.0
15	9/32	14 1/2	1 1/2	.075	1503-7	1504-7	1506-7	...	...	52.0
17	9/32	16 1/2	1	.050	...	...	...	1710-5	1714-5	26.7
			1 1/4	.062	...	1704-6	1706-6	1710-6	...	47.9
18	9/32	17 1/2	1 1/4	.062	...	...	1806-6	1810-6	...	51.4
			1 1/2	.075	1803-7	1804-7	1806-7	...	...	62.2
			1 3/4	.088	1803-8	1804-8	1806-8	...	...	84.7
19	9/32	18 1/2	1 1/2	.075	1903-7	1904-7	1906-7	...	...	65.2
21	9/32	21	1 3/4	.088	2103-8	2104-8	2106-8	...	...	100.4
24	9/32	24	1 3/4	.088	2403-8	2404-8	2406-8	...	...	114.0
	25/64		2	.100	2403-10	2404-10	...	...	...	147.4
30	25/64	30	2 1/2	.100	...	3004-10	...	...	...	230.0

CONVENIENT PACKAGING—
BLADES are packaged in easy-to-handle multiples of 10 blades per carton. Each carton is clearly marked with complete blade identification.



TO MARK PROGRESS

LADISH CO.

CUDAHY (Milwaukee Suburb) WISCONSIN

Serving the West... **LADISH PACIFIC DIVISION, LADISH CO., LOS ANGELES, CALIFORNIA**

Serving Canada... **LADISH CO. OF CANADA LTD., BRANTFORD, ONTARIO**

SALES OFFICES: Amarillo • Atlanta • Baton Rouge • Buffalo • Charlotte • Chicago • Cleveland • Denver • Havana • Houston
Los Angeles • Mexico City • New York • Odessa • Philadelphia • Pittsburgh • St. Louis • St. Paul • San Francisco • Seattle • Tulsa

The Bullard Company

cleans large castings 5 times faster with WHEELABRATOR®

A Room with a View . . . For Savings. That's this Wheelabrator Car-Type Room in the new $7,000,000 gray iron foundry of The Bullard Company. Large, heavy, bulky castings are cleaned in minutes instead of the hours required by manual blasting resulting in an immediate daily savings of two cleaning shifts. Foundry Supt. Stanley H. Bullard sums up the tremendous cleaning performance of this airless blast cleaning room in this manner, "We're tickled to death with it. The ricocheting of Wheelabrator Steel Shot cleans many interior areas we didn't expect it to reach."

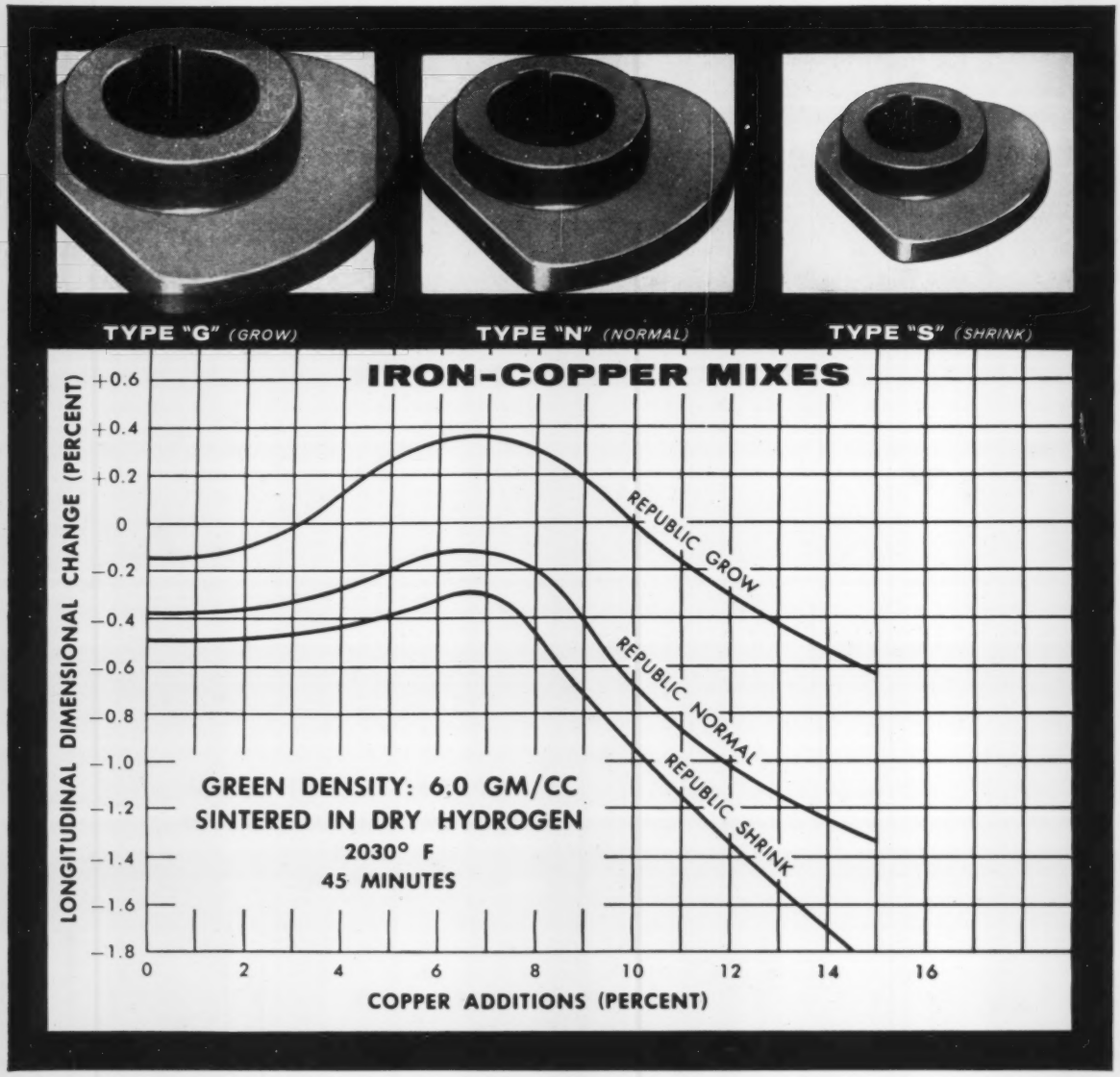
There's a Wheelabrator machine for every foundry cleaning problem. Write today for information.

Ideas in action are pictured and explained in this catalog on Wheelabrator Rooms. Write today for Catalog No. 854.

WHEELABRATOR
CORPORATION
509 South Byrkit Street, Mishawaka, Indiana

WORLD'S LARGEST MANUFACTURER OF AIRLESS BLAST CLEANING EQUIPMENT

Republic Iron Powders



REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

with cdf

aid in establishing finish dimensions of parts

The chart, at left, shows the distinct dimensional change-characteristic that occurs when any one of Republic's three new Iron Powders —Type "G" for growth, Type "N" for normal, Type "S" for shrinkage—is blended with varying amounts of copper.

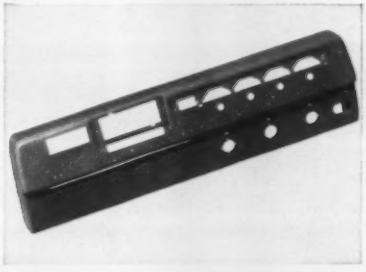
This change-characteristic is called *Controlled Dimensional Factor*—an exclusive Republic development.

All values in this chart represent the average of numerous tests conducted by Republic's Metal Powder Division in the development of these new types of iron powder. In all cases, one percent zinc stearate was used as lubricant.

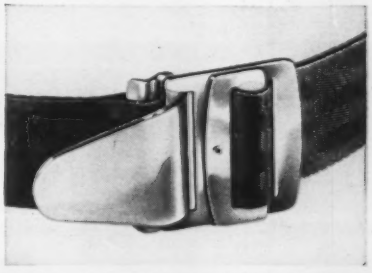
Republic Iron Powders with CDF can aid you in establishing the finish dimensions of parts. They can help you make better parts, reduce fabricating costs, and save on expensive die re-working.

Our metallurgists and engineers will help you utilize all the advantages of Republic Iron Powder with CDF. There is no obligation. Mail the coupon to obtain their services or for more information on test evaluations, chemical compositions, and physical properties.

BETTER TUBULAR PARTS are made with Republic ELECTRUNITE® Welded Steel Tubing. Harper-Wyman Company uses it in making lightweight, easy-to-clean venturi burner tubes. The company subjects ELECTRUNITE to a hairpin bend of 1¼-diameter radius, then a four-way crimp, followed by punching, notching and welding. Uniform, predictable ductility avoids stretch and collapse as tubing is severely bent and formed. Close tolerances of O.D. and I.D. avoid die and mandrel troubles. Write for facts.



QUALITY STAMPED AND DRAWN PARTS such as this electric range control panel are produced by Republic's Pressed Steel Division. Complete service is provided from design to fabrication. Topnotch facilities, plus years of know-how and experience, assure you of the best product. Equipment is available for blanking, cold and hot forming, drawing—also for complete assemblies. We handle the heaviest gages used in industry, including carbon and alloy steel or nonferrous metals. Write for Booklet Adv. 681.



STRONG, SAFE PARTS are fabricated from Republic ENDURO® Stainless Steel. Bunke-Musser Company uses Type 201 for this seat-belt buckle. Fabricating operations include shearing, punching, and severe bend of 175° to form the pelican hook. The company had tried carbon steel, but this required a heavier gage, chrome plating and polishing, with the end result being more expensive than stainless. Republic Type 201 provides strength, safety, wear-resistance, and workability. Write for booklet on the 200-Series stainless steels.

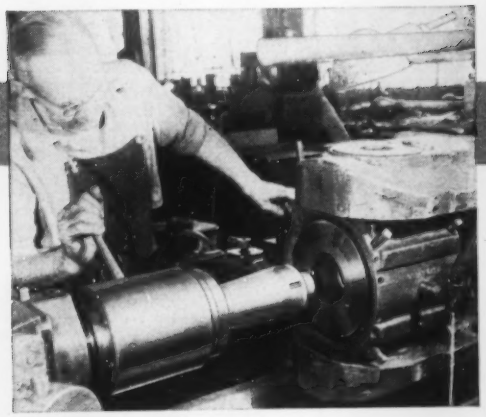
STEEL

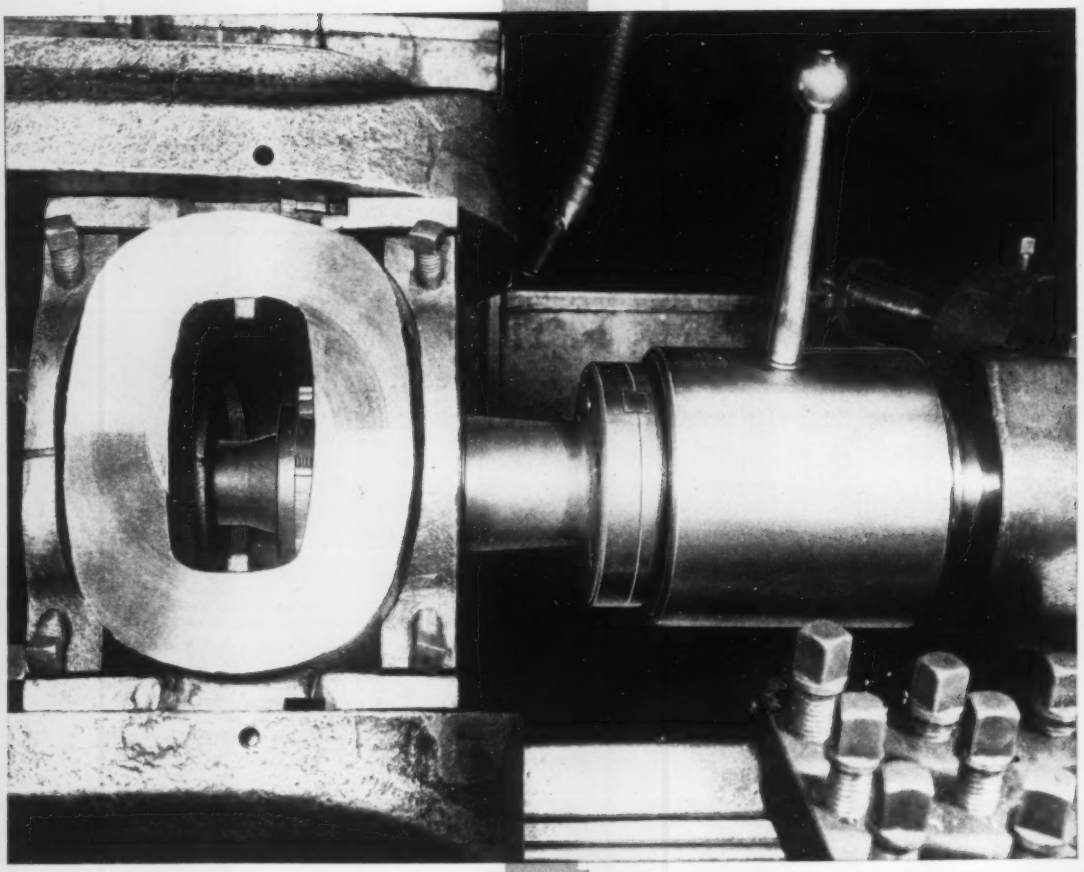
and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. C-3552A
3120 EAST 45th STREET • CLEVELAND 27, OHIO

☐ Send more information on Republic Iron Powders with CDF.
☐ Have an engineer call.
Send additional information on:
☐ ELECTRUNITE Welded Steel Tubing ☐ Stampings
☐ ENDURO Stainless Steels (200 Series)

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____





tapping threads from inside out

Seats are *tapped* in gate valves by using LANDIS Valve Taps, even though the diameter of the thread exceeds that of the valve port.

The use of a 6VB LANDIS Valve Tap at the Kerotest Mfg. Co., Pittsburgh Pa., illustrates the method and results of this operation. Specifications require 5" 12-pitch UN threads cut 5/8" long to Class 3 fit in 4" steel body castings.

Even though the seat thread diameter exceeds that of the valve port, the "collapsing action" of the tap (which withdraws the chasers into the head) gives sufficient clearance to move the tap into the port. The chasers are then expanded (from 3/4" on smaller taps to 2" on larger sizes) within the valve body, and threads are tapped outward as the lathe carriage is moved rearward by the leadscrew. (Note: Special chasers are available on certain of these operations that enable threading the opposing seats without removing the tap from the valve body.) After completing the thread, the tap is again collapsed and withdrawn.

Threads are cut at 12 R.P.M., and 100 threads are completed before regrinding the chasers. Each set of chasers produces an average of 700 pieces, excellent life with the short throat or chamfer required in this particular operation. Operation of the tap is by hand, and the valve body must be indexed 180° to thread the opposing seat.

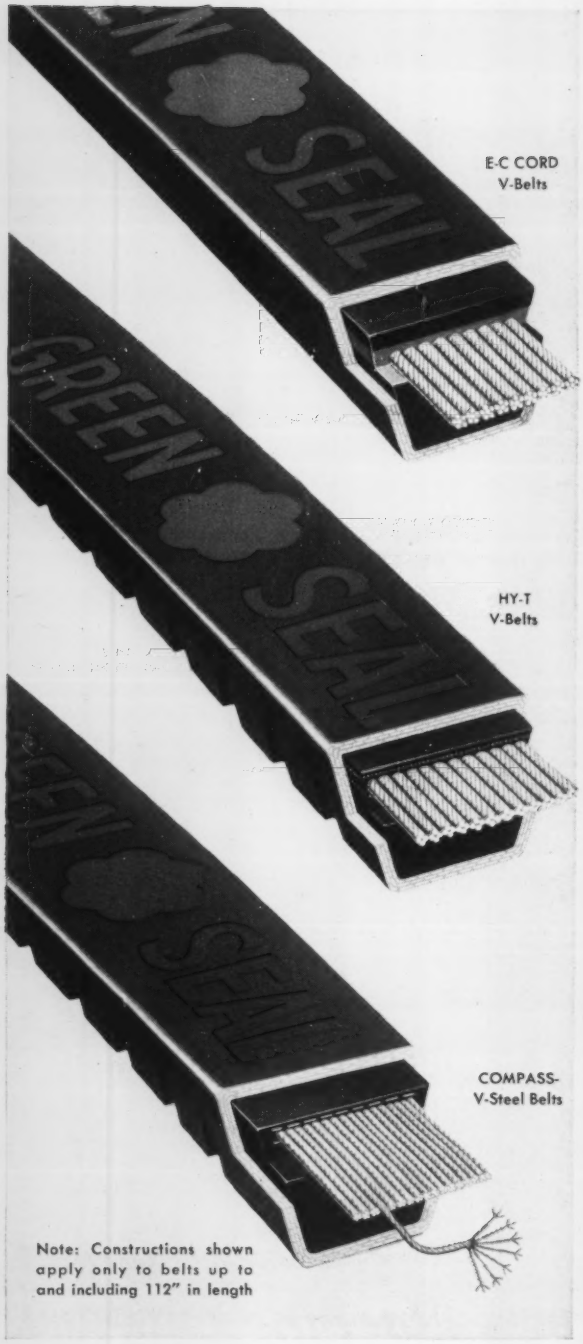
LANDIS Valve Taps are available for diameters from 2" to 24", and each tap body can be equipped with tap heads of various sizes to thread many different seat diameters. Note that these taps feature a tapered head, of great value where valve seats are inclined at an angle to the port opening. This allows tipping the valve body into threading position after the tap has entered the port. More information on request—please send drawings.

THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT · CUTTING · TAPPING · GRINDING · ROLLING

LANDIS *Machine* COMPANY

437-C.

WAYNESBORO • PENNSYLVANIA • U. S. A.



Why V-Belts with the Green Seal?

The Green Seal is put on each Goodyear multiple V-Belt for *your* protection. For it's your sign of a belt with dimensional stability—something long sought but only recently achieved in a complete line of V-belts.

What does dimensional stability mean to you? It means belt length remains the same from factory to drive. The length you order is the length you get. Matched sets stay matched. And mismatching – the biggest problem in belting multiple drives – is now a thing of the past.

How was this dimensional stability achieved? Until recently, stable belt length was possible only with steel cable load carriers as developed by Goodyear. But now it is also accomplished with synthetic cord through the exclusive Triple-Tempered 3-T process that stabilizes length by careful tempering with Tension, Temperature and Time.

Triple-Tempering also gives you a stronger, more shock- and stretch-resistant belt. Add "balanced construction" – with each component of the belt designed to its job – and you have a smoother-, longer-running belt which means maximum, trouble-free horsepower hours at minimum cost.

DIMENSIONALLY STABLE V-BELTS with the GREEN SEAL by

GOODYEAR

THE GREATEST NAME IN RUBBER

The Goodyear Tire & Rubber Company, Dept. 794, Akron 16, Ohio

Please send me more information about how V-Belts with the Green Seal solve the major problem in belting multiple V-belt drives.

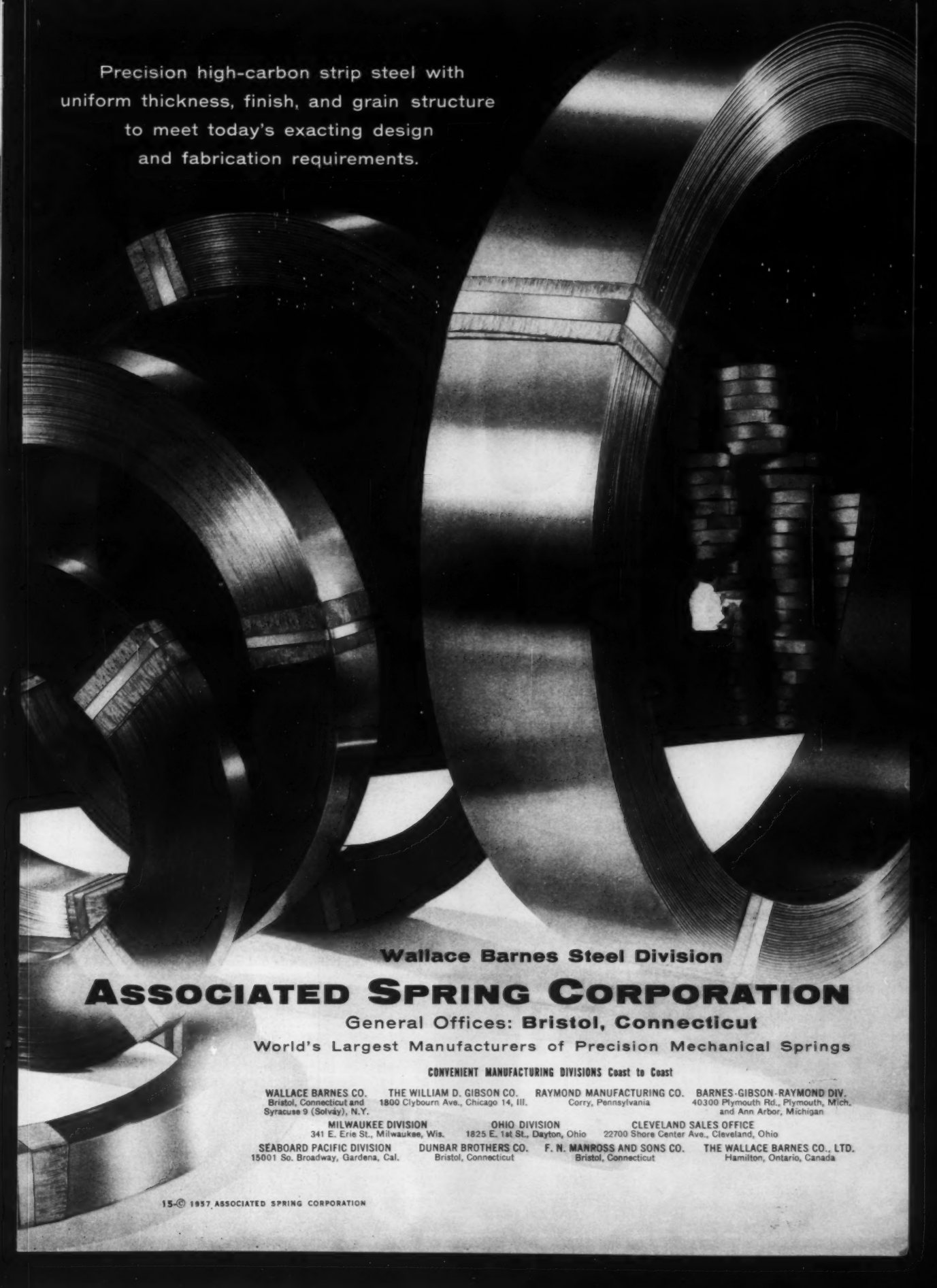
Name_____

Company_____

Street Address_____

City_____ **Zone**_____ **State**_____

Compass, E-C Cord, Hy-T, Green Seal–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio


Precision high-carbon strip steel with
uniform thickness, finish, and grain structure
to meet today's exacting design
and fabrication requirements.

Wallace Barnes Steel Division

ASSOCIATED SPRING CORPORATION

General Offices: **Bristol, Connecticut**

World's Largest Manufacturers of Precision Mechanical Springs

CONVENIENT MANUFACTURING DIVISIONS Coast to Coast

WALLACE BARNES CO.
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Bristol, Connecticut

THE WALLACE BARNES CO., LTD.
Hamilton, Ontario, Canada

15-© 1957 ASSOCIATED SPRING CORPORATION

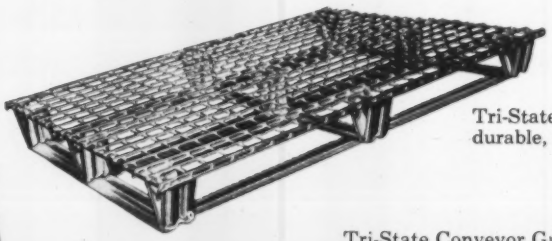
Now...

TRI-STATE ENGINEERING COMPANY—manufacturers of

CARGOTAIN

...resumes handling the sales and service of our patented heavy duty steel wire containers, pallets, conveyor guard and other material handling equipment through our own marketing organization.

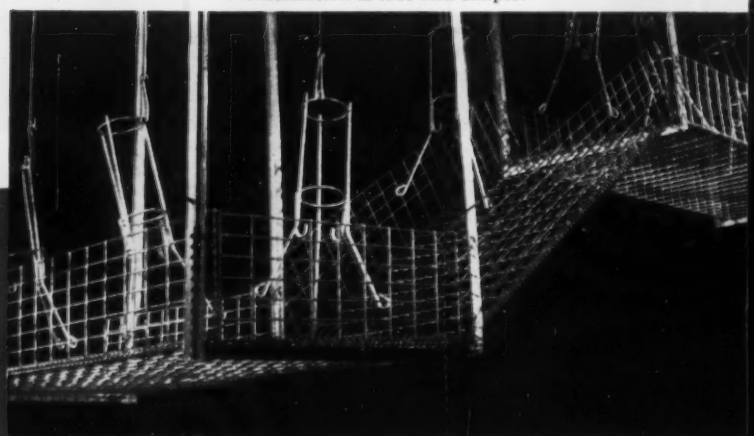
*Reg. U. S. Pat. Off.
U. S. Pat. No. 512417



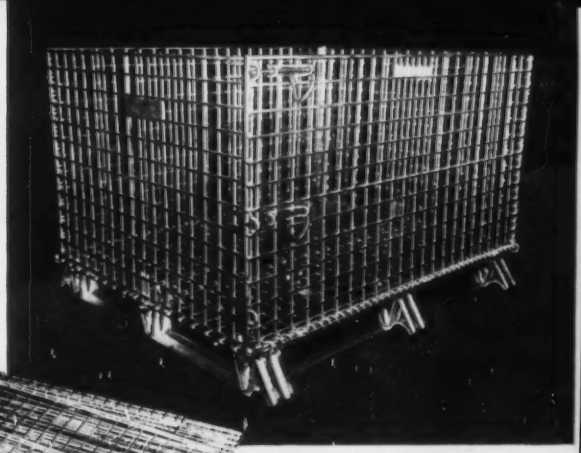
Tri-State Pallets are light, strong, durable, easy to handle.

Tri-State Conveyor Guard has the strength for adequate protection, and installation is fast and simple.

Elimination of center legs on Clearview model permits use with any type of moving equipment.

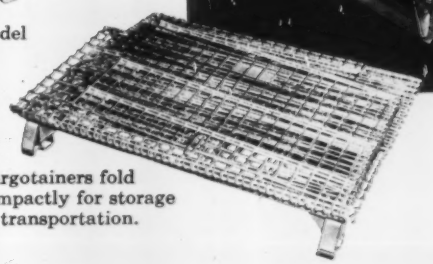


Clearview Model

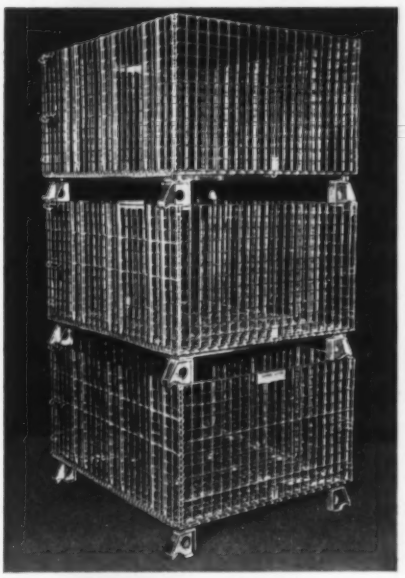


Stripbase Model

ERS*



Cargotainers fold compactly for storage or transportation.



All models stack easily and firmly.

CARGOTAINER is the registered trade name of a line of heavy duty steel wire containers developed by Tri-State Engineering Company which have been widely accepted throughout industry. These containers are used for handling, storing and shipping a wide range of industrial parts, components and finished products.

Tri-State introduced CARGOTAINERS in 1946, and has been manufacturing them ever since. Other products in our line are Pallets, Conveyor Guard and other material handling equipment, also developed and manufactured by us.

For the first few years after CARGOTAINERS were introduced, we marketed them ourselves. Later, in order to concentrate on the manufacturing problems created by the rapid growth in demand for this product, we entered into a sales agreement with another company. This agreement was terminated as of September 1, 1957.

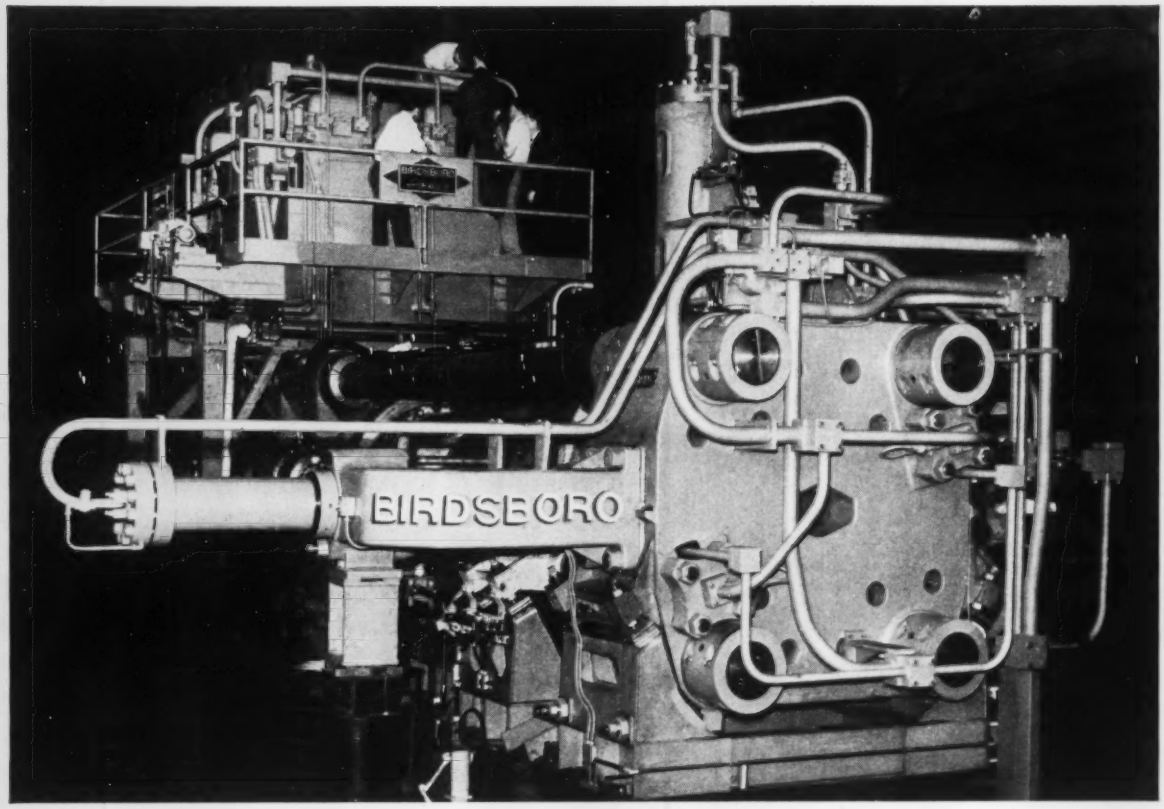
Now, Tri-State Engineering Company is again selling our products through our own salesmen and dealers. We believe that this direct contact, through our own organization, will enable us to give you better service and, of course, the same high quality in materials and workmanship which have set such high standards for our line of material handling equipment.

B. R. BECKNER,
President

CARGOTAINER
DIVISION

TRI-STATE ENGINEERING COMPANY
Washington, Pennsylvania

Manufacturers of Cargotainers, Pallets, Conveyor Guard and other Material Handling Equipment



MORE revolutionary design features in this new aluminum extrusion press by BIRDSBORO

Again Birdsboro's engineering staff has come up with unique design features for a major aluminum extruder. This time it's an unusually fast acting 3,000-ton oil hydraulic extrusion press that substantially reduces dead cycle time.

No detail has been overlooked by Birdsboro in turning out this advanced unit.

This same imaginative service is yours when you call on Birdsboro to handle your hydraulic press job. For a more comprehensive picture of the Birdsboro staff that can put new future in your operation . . . and *specification data sheets* on the press described here, drop us a line. *Main office and plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa., *Subsidiary:* Engineering Supervision Co., 120 W. 42nd St., New York 36, N.Y.

Check These BIRDSBORO Engineering Innovations:

- ✓ Capable of producing a broad range of aluminum sections and tubing of round, rectangular and irregular shapes.
- ✓ Four electronically-controlled variable-delivery radial piston pumps are driven by two 350 hp motors.
- ✓ The press can operate on 3 pumps while one is being maintained, thus minimizing downtime.
- ✓ Complete flexibility is offered by the variable-delivery pumps and push button controls.
- ✓ Extrusion speed, ranging from 0 to 42″ per minute can be regulated from either the main pulpit or from a location overlooking the emerging extrusion.
- ✓ A unique die slide arrangement provides an alternate location for inserting, removing, dressing or adjusting a second die while extrusion continues uninterrupted.

HP1-57

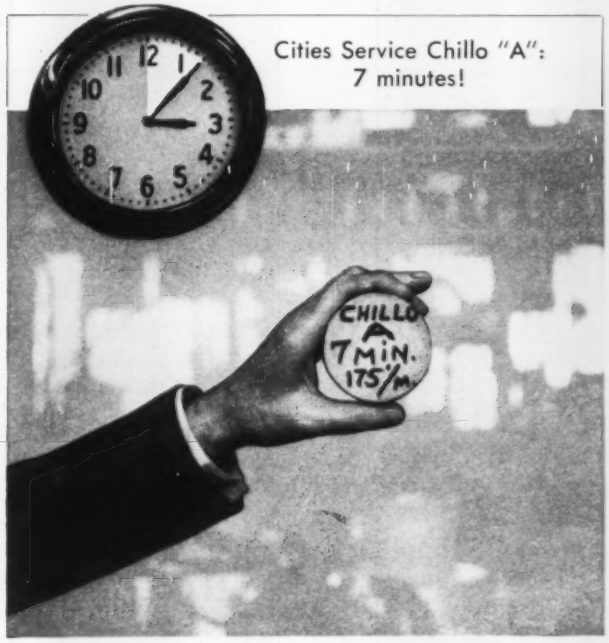
BIRDSBORO

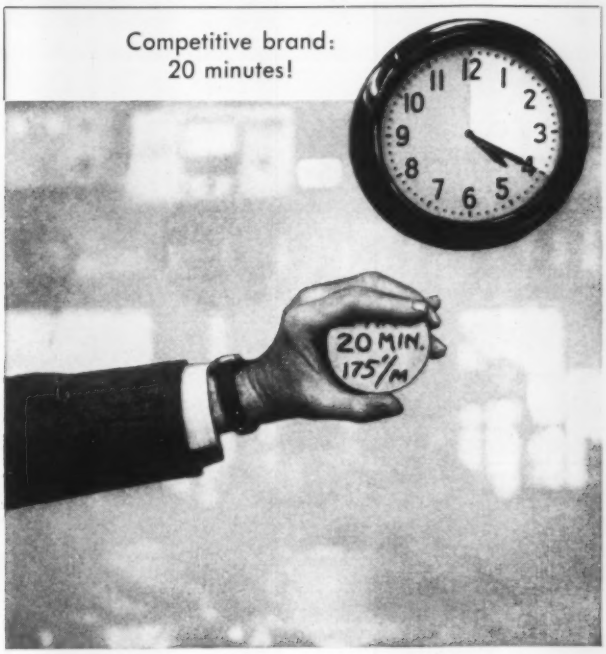
STEEL FOUNDRY AND MACHINE CO.

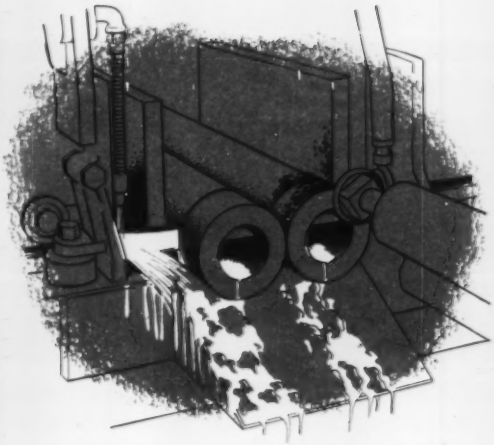
STEEL MILL MACHINERY • HYDRAULIC PRESSES (Metalworking and Extrusion) • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

Cutting Oil takes the time test

at S. G. Frantz Co., Inc., Trenton, N. J.







S. G. Frantz Company decided to keep a truly open mind.

They'd been using Cities Service Chillo Cutting Oil and other Cities Service products for some time with great satisfaction. Still, there was no harm testing Chillo Cutting Oil against another brand just to make sure they were getting maximum results.

But even the people at S. G. Frantz never expected what followed. Using the competitive oil, and a piece of 4130 aircraft rod, 2⅞" in diameter, they made a single cut at saw speed of 175 feet per minute. Time: 20 minutes.

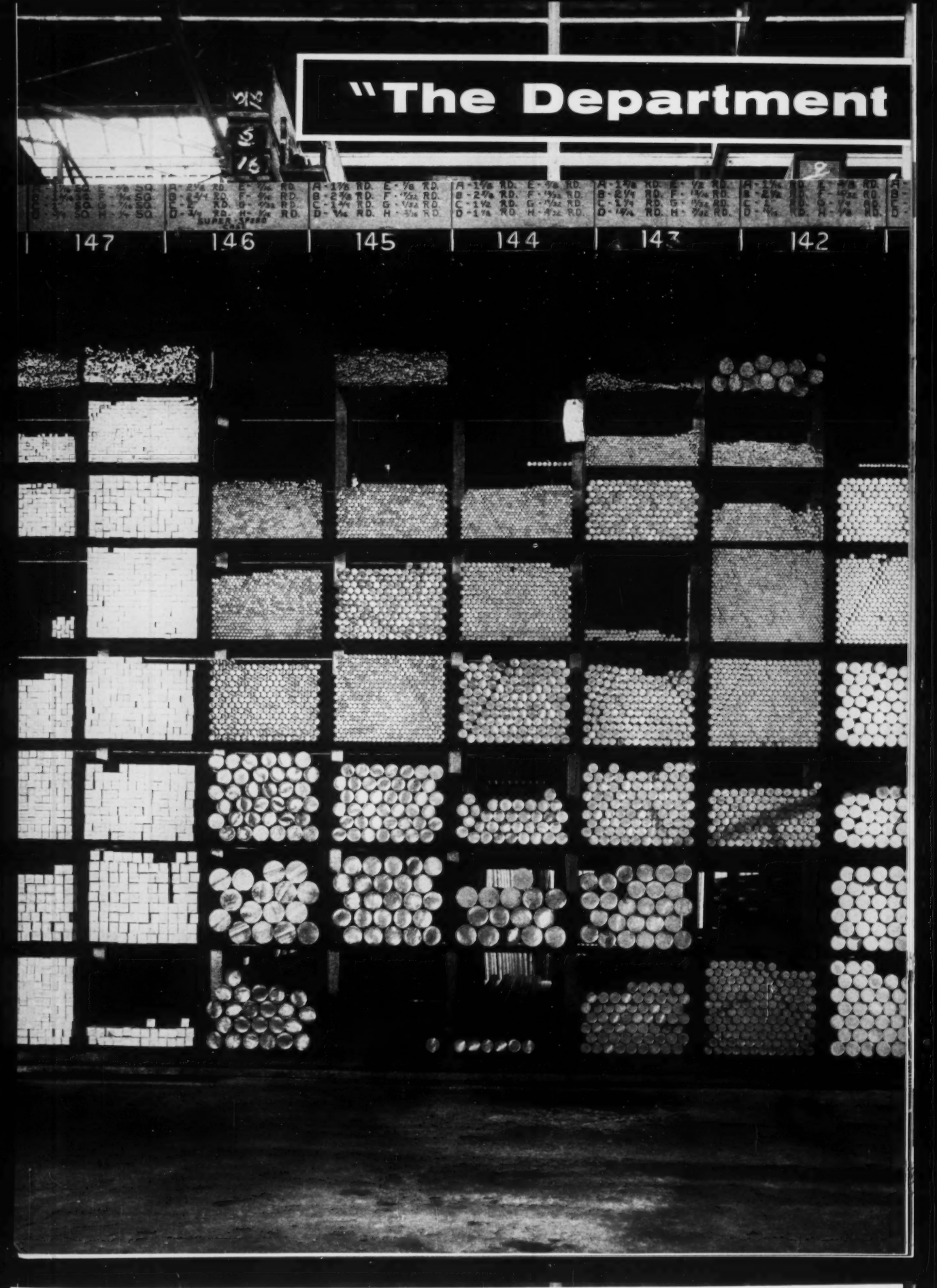
Next, the same test again – but this time with Cities Service Chillo "A" Cutting Oil. Time: 7 minutes! Nearly three times faster!

Using the same material on another job, the Frantz Company found difficulty making clean threads to aircraft standards on a Number 5 Turret Lathe–that is, until Cities Service Chillo 10Z was tried. Right there the problem ended.

"The problem ended." You'll hear it again and again from those who use Cities Service Cutting Oils and lubricants. And perhaps these oils can end a problem for you, too. Talk with a Cities Service Representative. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS


"The Department
147
146
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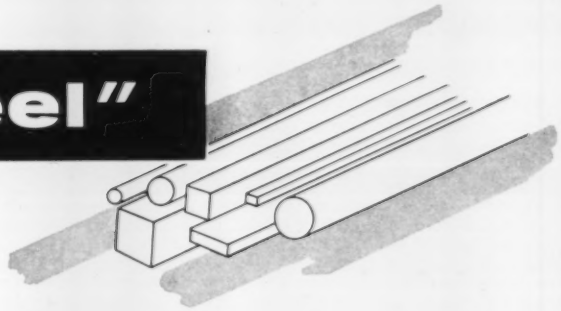
Store of Steel"



One piece or a truckload . . . we've got it!

Call your J & L Steel Warehouse . . . your "Department Store of Steel". . . for prompt delivery of your next cold-finished steel order.

Use our widely diversified range of sizes and analyses as your inventory. Give us a call on your next steel order . . . make your J & L Steel Warehouse your "Department Store of Steel."

J & L Steel Warehouse Division

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LOUISVILLE · MEMPHIS · NASHVILLE · NEW ORLEANS · NEW YORK · PITTSBURGH

FIND US FAST IN THE YELLOW PAGES

CLAYMONT your for Fabricated

Claymont's new Fabrication Shop provides more than 100,000 square feet of floor space containing a complete range of efficient production line layout and modern shipping facilities.

You'll save time and money by letting Claymont perform difficult, time-consuming machining and fabricating operations on your steel plate before it's delivered to you.

Claymont Has The Facilities... Our new Fabrications Shop is completely equipped to perform all these steel plate operations:

WELDING · SHEARING · PUNCHING · MILLING · PAINTING BENDING · CUTTING · BORING · GRINDING · CHIPPING · EDGE PREPARATION · ROLLING · PRESSING · DRILLING · SHAPING PRIMING · SHOT BLASTING

Your Supply Of Steel Is Assured... Claymont's is a completely-integrated operation. From the selection of raw materials through blast furnace, open hearth, rolling mill to steel plate fabrications . . . every operation is performed within the company.

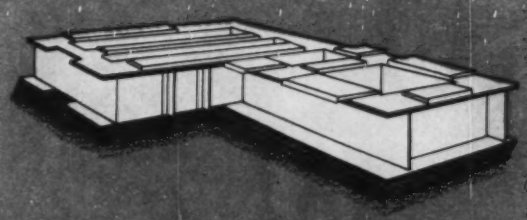
You Get Uniform Quality In Accordance With Your Needs . . . Because Claymont's operations are fully integrated, we are able to exercise rigid quality controls throughout every single stage of production and fabrication to assure that customer specifications will be met.

Bring your steel parts problems to Claymont. For complete information contact the sales office nearest you.

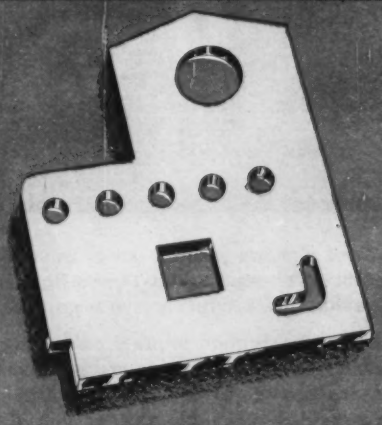
4936

dependable source
Steel Parts

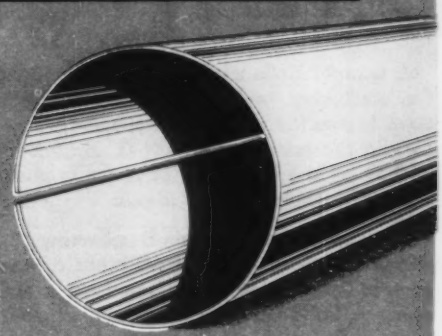
Production Weldments—Many production component parts for which castings are presently being used can be safely and profitably replaced by weldments. The advantages: cost savings plus reduction in weight with no loss in strength. Claymont is completely equipped to produce weldments in many sizes and shapes, and from a wide variety of steels.



Flame-Cut Patterns—Claymont has multiple-torch travagraphs for producing large quantities of irregular shapes that exceed the gage or size limitations of blanking presses; and single-torch, semi-automatic radiagraphs for cutting straight cuts and simple patterns, circles and smaller-quantity jobs. A special type of radiagraph is used to prepare edges prior to welding.



Heavy-Duty Plate Forming—Claymont's heavy-duty mechanical pressing, bending, and shaping equipment is capable of a wide variety of forming operations on heavy steel plate.



OTHER CLAYMONT PRODUCTS

Alloy Steel Plates · Large Diameter Welded Steel Pipe
High Strength Low Alloy Steel Plates · Stainless-Clad Plates
Manhole Fittings and Covers · Flanged and Dished Heads
CF&I Lectro-Clad Nickel Plated Steel Plates

CF&I

Claymont Steel Products

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

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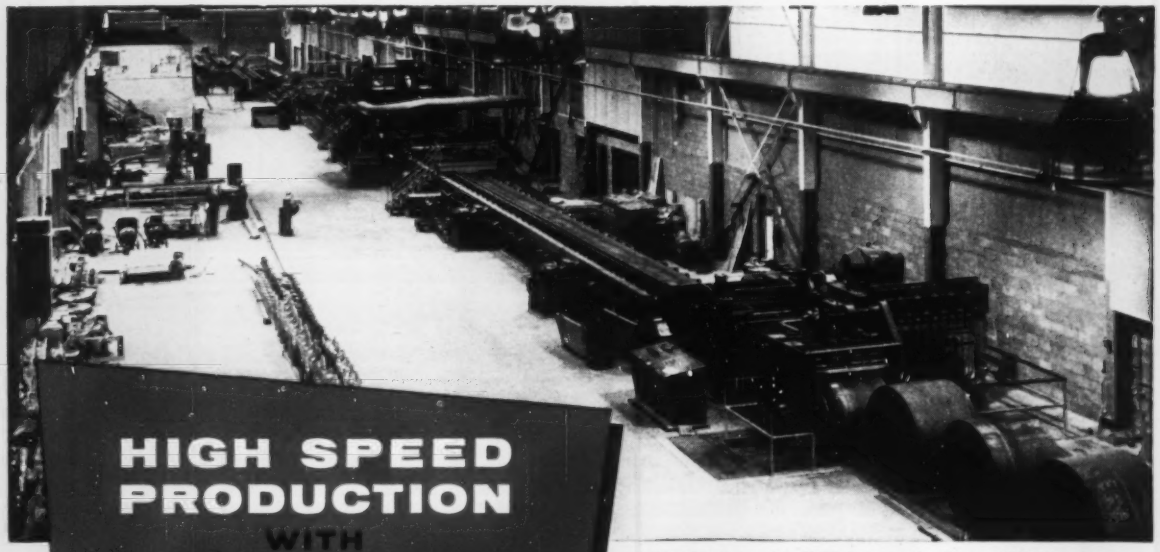
San Francisco · San Leandro · Seattle · Spokane · Tulsa · Wichita
CF&I OFFICES IN CANADA: Montreal · Toronto · **CANADIAN REPRESENTATIVES AT:** Calgary · Edmonton · Vancouver · Winnipeg



HIGH SPEED PRODUCTION WITH RELIANCE V★S DRIVES

Six Reliance V★S Drives make it possible to operate this complete line as if it were a single machine.

Carloads of pipe are pouring out of the new Edmonton, Alberta plant of Alberta Phoenix Tube & Pipe, Ltd. This $6.5 million installation is producing pipe at unprecedented rates.

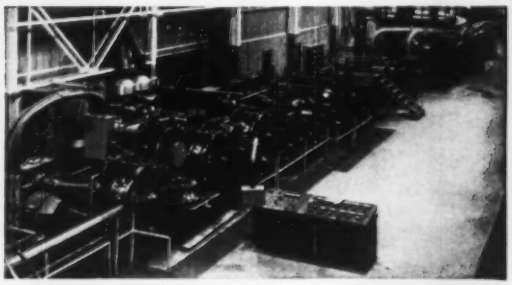
Volume pipe production requires something special in a drive system—one that furnishes precise speed control and instantaneous motor response. A wide stepless range of speeds is provided to handle various pipe diameters and lengths, and all sections of the line operate at the same relative speed.

A team of Reliance Application Engineers, working with the machinery builder, built this specialized drive. This team knows the processes of the steel industry and how to handle the problems involved. Engineering knowledge, backed by the quality of Reliance products, supplied this accurate, simple-to-operate, economical drive.

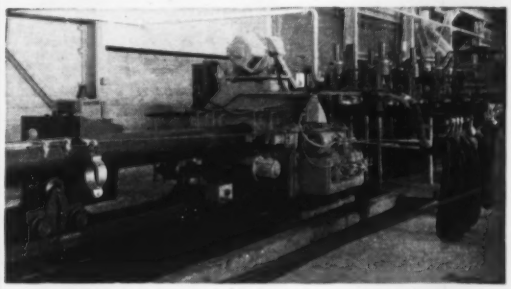
The Reliance Application Engineering Department builds drives for every industry. A team of engineers who are experts on your industry's operation, stand ready to engineer and build the drive for your particular needs.

If you would like more information on this installation, write for Bulletin L-2505.

L-1541



The welding section operator controls the speed of the entire line from this Reliance Pendent Station.

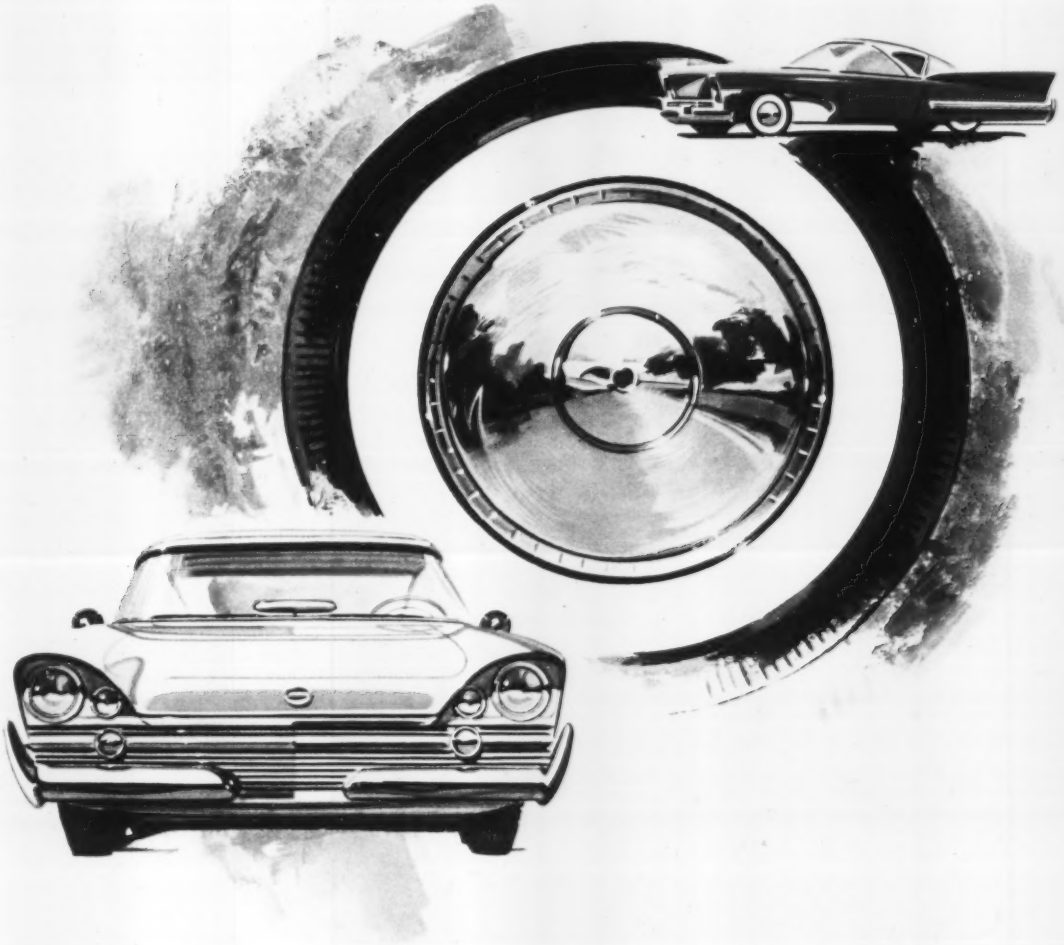


The Reliance V★S Drive on this flying cutoff automatically measures the pipe and controls the movement and speed of the carriage.

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 49A, CLEVELAND 17, OHIO • CANDIAN DIVISION: WELLAND, ONTARIO

Sales Offices and Distributors in Principal Cities



bright idea

For enduring beauty that sells in a new car and
re-sells in a used car . . . design it, improve it and protect it
with McLOUTH STAINLESS STEEL.

specify

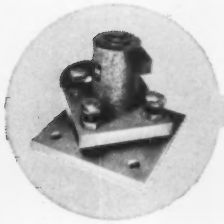
McLOUTH STAINLESS STEEL

HIGH QUALITY SHEET AND STRIP

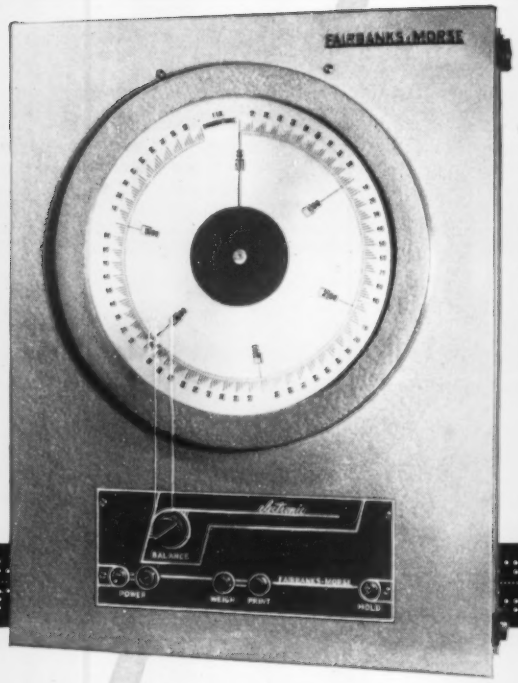
for automobiles

McLOUTH STEEL CORPORATION DETROIT, MICHIGAN

MANUFACTURERS OF STAINLESS AND CARBON STEELS



Weigh in the language of accounting machinery



Now it is possible for your scales to "talk" directly to your business machines like automatic typewriters, automatic adders or motorized tape punches. Fairbanks-Morse electronic scales can do this and save you many time-consuming and costly intermediate operations — each with the opportunity for human error.

The weight message from the electronic load cell is translated to the language of business machines by the Fairbanks-Morse Model CDO Readout Instrument. The CDO will convert from decimal to the five channel, seven channel, eight channel or coded decimal codes — whichever system you are using. Send for the new CDO bulletin No. ED-16 today. It will suggest many applications for automatic and remote weighing. Fairbanks, Morse & Co., Dept. S-9-23, 600 South Michigan Ave., Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS

Delicate appetite for a "Queen" . . .

80 TONS IN ONE BITE!

But look at the size of her! Taller than a 13-story building, and weighing 2,400 tons, this lady is entitled to a queen-size appetite. She's the *River Queen*—largest power shovel ever built by the Bucyrus-Erie Company. And her huge, 80-ton-capacity bucket is made of tough USS "T-1" Steel to keep her eating regularly for a long time. Backed by 15 powerful motors and fronted by a formidable row of ripping teeth, the "Queen's" huge maw scoops up 55 cu. yds. of overburden at a gulp and dumps it nearly 300 feet away from the digging point. Digging and dumping in less than a minute, the *River Queen* could pile up a mountain of more than 100,000 tons of overburden in 24 hours!

This big shovel is being used to uncover two seams of coal for W. G. Duncan & Peabody Coal Companies in western Kentucky. When the mine is in full operation, its output is expected to be 2 million tons of coal annually. The "Queen" will be highly instrumental in making this possible.

With all the weight and mechanical muscle the big shovel possesses, her dipper has to be a real battering ram. That's why it's made of USS "T-1" constructional alloy steel. Biting and ramming through rock and earth, hour after hour, day after day, is punishing service. USS "T-1" Steel is designed to take this kind of impact, shock and abrasion. And its amazing toughness never falters, even at temperatures far below zero.

The very high yield strength of USS "T-1" Steel—90,000 psi minimum—saved tons of weight in the big dipper, making a bigger payload possible with each scoop. And, speaking of strength, the 86-foot dipper handle and the 145-foot boom are made of another U. S. Steel product, USS TRI-TEN high-strength low-alloy steel.

• • •

Perhaps you need a steel that offers high strength, extraordinary toughness, resistance to impact abrasion, or good creep rupture strength combined with ease of fabrication. USS "T-1" Steel is your answer, and we'll gladly help you adapt it to your particular application. United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

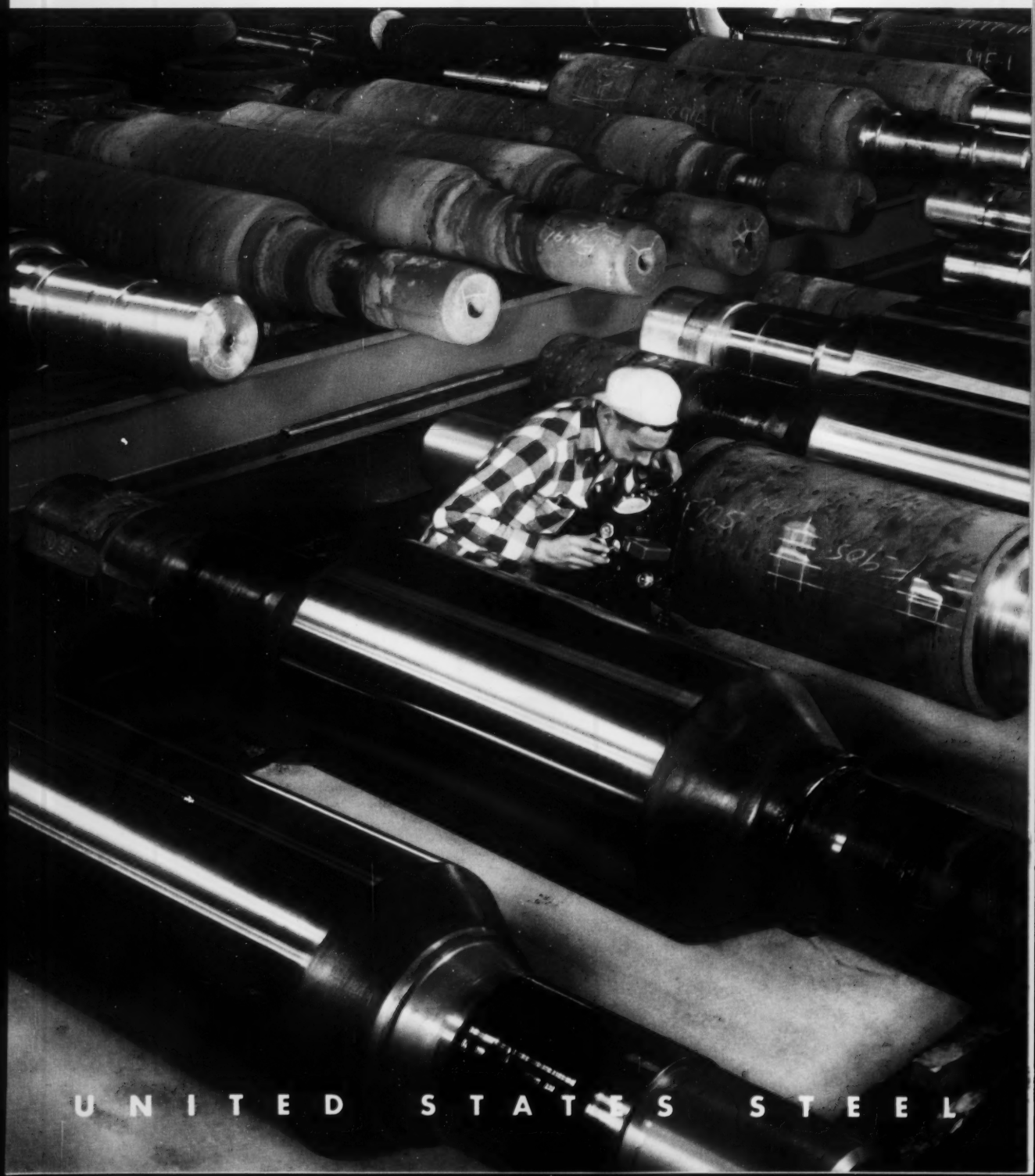
United States Steel Corporation, Pittsburgh · Columbia-Geneva Steel Division, San Francisco
Tennessee Coal & Iron Division, Fairfield, Ala.
United States Steel Supply Division, Warehouse Distributors, Coast-To-Coast
United States Steel Export Company, New York

USS "T-1" CONSTRUCTIONAL ALLOY STEEL

USS, "T-1," and TRI-TEN are registered trademarks.

UNITED STATES STEEL

949 tons of tin product rolled



in 8 hours—on USS Quality Forged Rolls

THE MAN IN THE SMALL PICTURE is Charles D. Kelly, Superintendent of the cold reduction and sheet finishing department at U. S. Steel's giant Fairless Works. He was completing his 20th year when a crew on the 5-stand cold reduction mill rolled out an impressive 949 tons of tin product in a single 8-hour shift.

The mill was equipped with USS Quality Forged and hardened rolls, as might be expected. But you should know that no U. S. Steel mill is obligated to buy rolls from the company if competitive rolls will give better performance. Here is the heart of the story: based on careful long-range performance figures, the USS forged rolls are equal to or better than any other on the market.

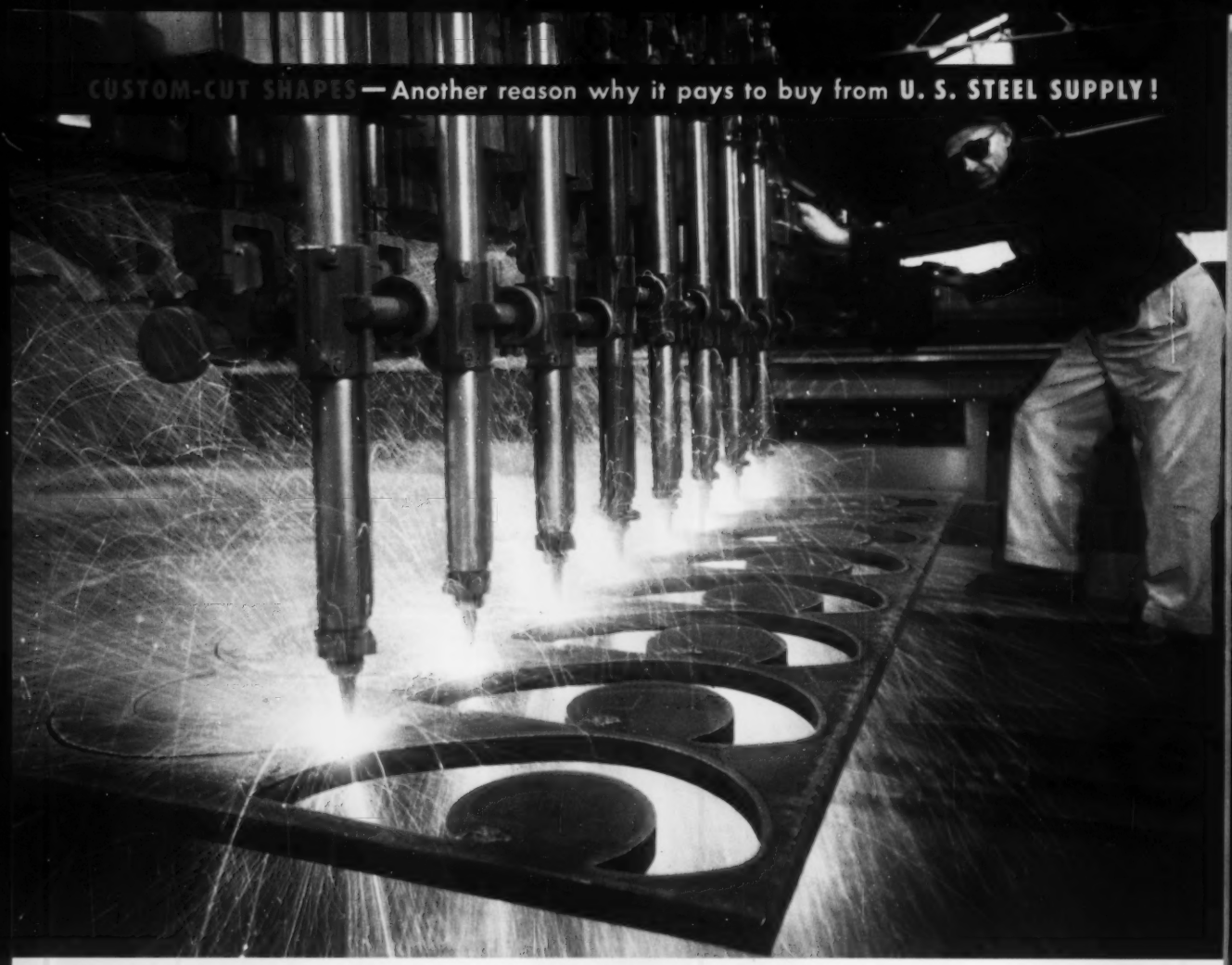
As a major steel producer, U. S. Steel has the opportunity to test the quality of its rolls. Even further, U. S. Steel buys rolls from other manufacturers—for an evaluation of our product. Over and over again, records have shown that USS Quality Forged Rolls have improved wear resistance, and a high degree of cleanliness.

When buying most custom-made steel products, the customer specifies the quality, type and chemistry of the steel, as well as heat-treating procedures and other manufacturing methods. Not so with rolls. With the exception of physical dimensions, surface finish and hardness level, rolls are sold strictly on the basis of performance. Do you keep a careful record of your roll performance? If you do, you may well find yourself ordering USS Quality Forging rolls *all* the time.

Please address inquiries or requests for our free 32-page Forging booklet to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

USS QUALITY FORGINGS

heavy machinery parts... carbon, alloy, stainless
forged steel rolls and back-up roll sleeves
electrical and water wheel shafts
specialty forgings of all types



U. S. Steel Supply's flame-cutting service

reduces handling and machining costs

THE PICTURE ABOVE shows an ultra-modern automatic flame-cutting machine *pre-shaping to exact specifications* an order of plate steel for a U. S. Steel Supply customer. And saving him plenty . . . by reducing his handling and machining costs . . . and by improving both the *quantity* and the *quality* of his output.

You'll find the latest custom-cutting equipment, including costly flame-cutting machines in all of our 18 warehouses. By using our facilities, you eliminate the need for installing and maintaining equipment of this type in your plant . . . and thereby materially reduce your capital investment in shop equipment.

If you would like to know about the time-and-money-saving advantages of buying your steel from U. S. Steel Supply, contact our nearest warehouse or direct your inquiry to our General Offices in Chicago.

U. S. STEEL SUPPLY

DIVISION

P. O. Box 1099, Chicago 90, Ill.

General Offices:
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Warehouses and Sales Offices Coast to Coast

UNITED STATES STEEL

Crane-of-all-work

THE ROUSTABOUT—manufactured by the Hughes-Keenan Corporation—is a highly versatile, highly maneuverable motive crane. It has an extremely short turning radius, travels at speeds up to 15 m.p.h. All three crane operations—swinging the boom, raising and lowering the boom, working the hoist line—can be performed simultaneously or independently. All six models (5 ton capacity shown) can be specially equipped for construction work, in-plant or out-plant materials handling. To assure maximum power efficiency and dependability, Roustabout Cranes are powered by big-output, heavy-duty Chrysler Industrial Engines.

THE PAYOFF POWER IS CHRYSLER

CHRYSLER INDUSTRIAL 30

(230 cu. in. displacement) powers the 3, 4, 5, 6 ton models of the Roustabout Crane. (Industrial 32, 265 cu. in. displacement powers 10, 12½ ton models.) Both of these in-line six engines also power many other makes of equipment in the construction and materials handling fields. There are four Chrysler in-line 6s, two V-8s—ranging from 230 to 354 cu. in. displacement.

Chrysler
INDUSTRIAL ENGINES
INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

Write Dept. D9, Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan, or see your nearest Chrysler Industrial Engine Dealer.

☐ For engineering information ☐ For descriptive literature

NAME

ADDRESS

CITY ZONE STATE

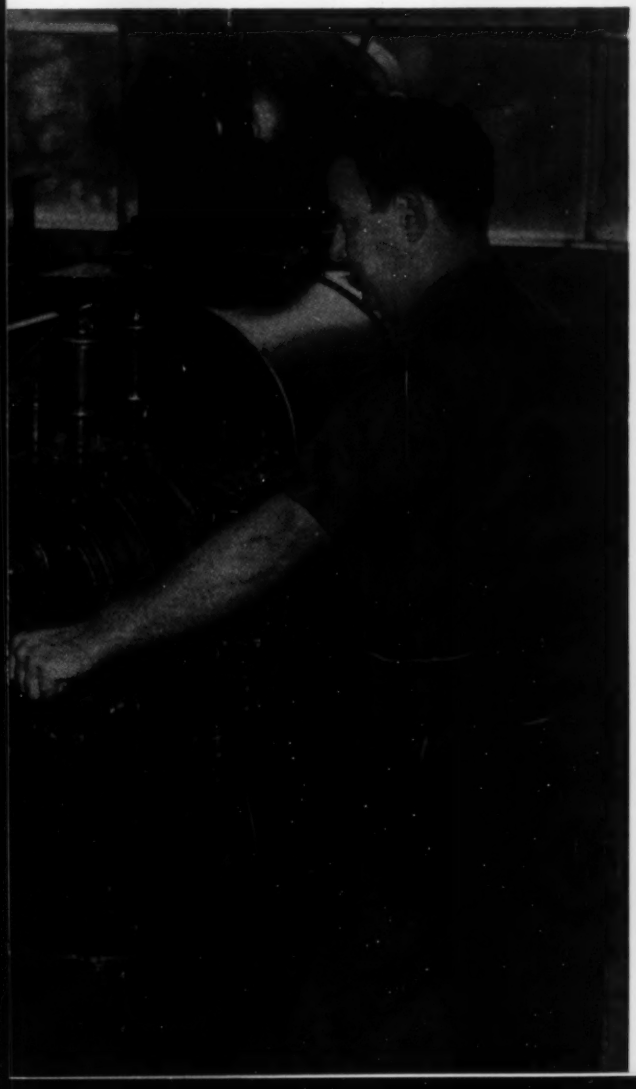
They cut out three oils by changing to one...

Standard Oil lubrication specialist Bob Cleland and plant manager I. G. Smallegan inspect work furnished by operator Dick Stockwell. Giving technical help to customers like this is something for which Bob Cleland is well fitted. Bob has a mechanical engineering degree from Michigan State and has completed the Standard Oil Sales Engineering School.

STANICUT Oil 166 BC

Screw machine plant saves on oil inventory and handling, receives other benefits by converting to dual-purpose cutting oil.

Grand Rapids Metal Products Company's problem was the mixing of cutting and lubricating oils in their National Acme and Gridley screw machines. In all, four oils were used. In some machines a cutting oil, two lubricating oils and a base oil were employed to improve machining characteristics. Lubricating oil leaking past seals mixed with the cutting oil, reducing cutting oil qualities. Oil mixtures were constantly varying, and troubles in tapping resulted.



Standard Oil's Bob Cleland, working with plant management, suggested STANICUT Oil 166 BC. This oil, he explained, is a dual-purpose oil. It can be used for lubrication as well as for cutting, and no dilution of the cutting oil can occur.

After a week's trial in one machine, the entire plant was converted to STANICUT Oil 166 BC. Tap troubles were reduced, resulting in much less down time. Spindle speeds have been increased, yet the spindles run cool. Oil inventories have been reduced from four to one.

STANICUT Oil 166 BC does not corrode bearings, gears, bushings, spindles or other machine parts. While STANICUT Oil 166 BC contains E.P. additives, it does not stain copper or brass.

Get the facts on how STANICUT Oil 166 BC can help you. Call the Standard Oil office nearest you anywhere in 15 Midwest and Rocky Mountain states. Or write to Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Quick facts about
STANICUT OIL 166 BC

1	A dual-purpose oil — suitable for both cutting and lubrication.
2	Non-corrosive to work or machines.
3	Formulated with E.P. additives.
4	Stable under all normal conditions.
5	Non-irritating.
6	A cutting oil that permits high operating speeds.
7	Non-staining to either copper or brass.

STANDARD

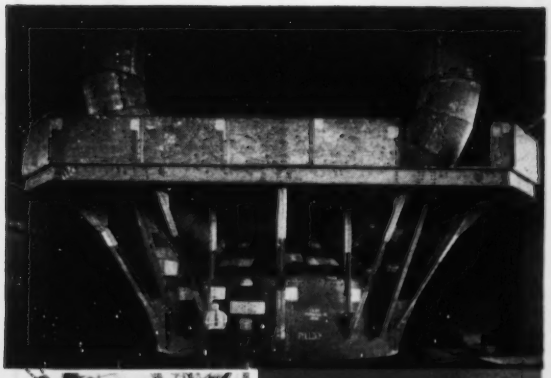
STANDARD OIL COMPANY
(Indiana)

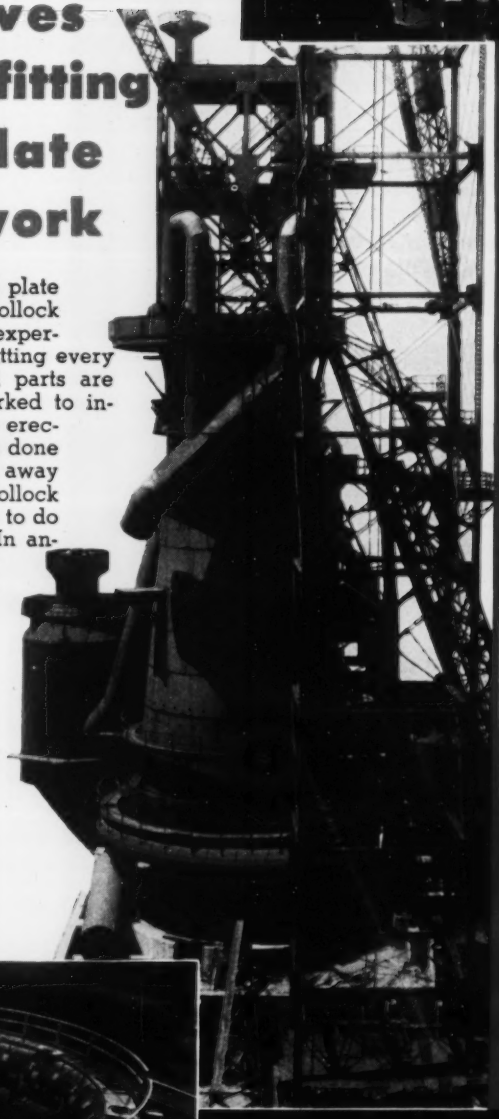
from TOP to BOTTOM

POLLOCK gives you precision fitting in all steel plate construction work

Let Pollock handle your next steel plate fabrication and erection job, for Pollock skilled experts have had years of experience . . . can give you precision fitting every time! Before leaving the shop, all parts are assembled and carefully match-marked to insure close, accurate fits and speedy erection in the field. So carefully is this done that one customer — 12,000 miles away has ordered steel work from Pollock three times, and each time was able to do his assembling quickly and easily. In another instance, the Pollock Company tore down and rebuilt the steel work for an entire blast furnace which was out of operation only 83 days, setting a new world record and saving over 20,000 tons of pig iron.

You, too, can benefit from Pollock's broad experience . . . its complete facilities and well-trained engineering-designing staffs. Whatever your fabricating job — large or small — heavy or light — put it up to Pollock and see how you save!





Blast Furnaces

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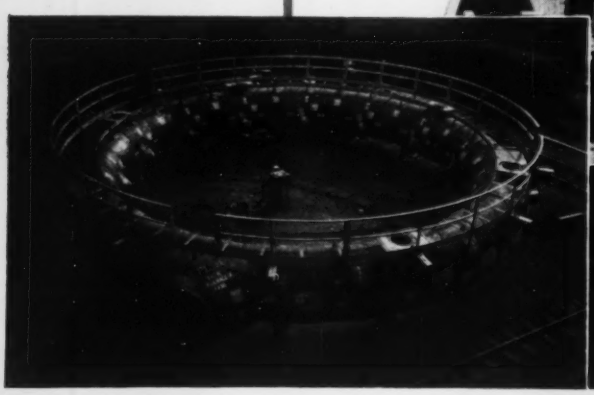

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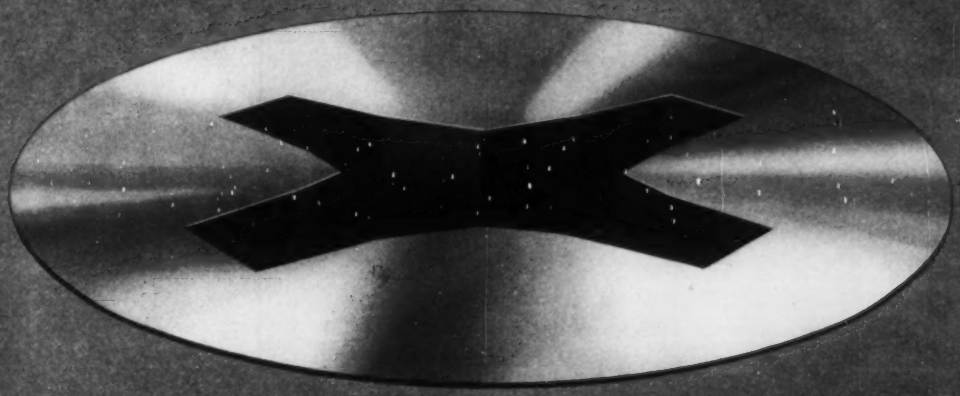
ENGINEERS FABRICATORS ERECTORS

Cut assembly time—lower production cost



with
PHILLIPS CROSS-RECESSED HEAD SCREWS

Be Sure — Select The Best

There are many manufacturers of Phillips Cross-Recessed Head Screws. It is important for you to know that some of them are members of Screw Research Association for this major purpose:

To make sure that the quality of their products remains the very highest regardless of competition. They accomplish this by rigidly controlling manufacture according to the standards set up by their Phillips Cross-Recessed Head Standards Committee.

Consistent good quality fasteners for your products from these reliable sources are assured by common adherence to precision accuracy of dimensional standards, inspection gauges and gauging methods established by the Phillips Cross-Recessed Head Standards Committee sponsored by Screw Research Association.

You can rely upon these sources for product reliability which assures correct mating fit between recess and driving point. This eliminates driver slippage, and prolongs driver and bit life, improves product appearance and reduces your costs.

Members of Screw Research Association . . .

You can rely on these sources . . . for product reliability

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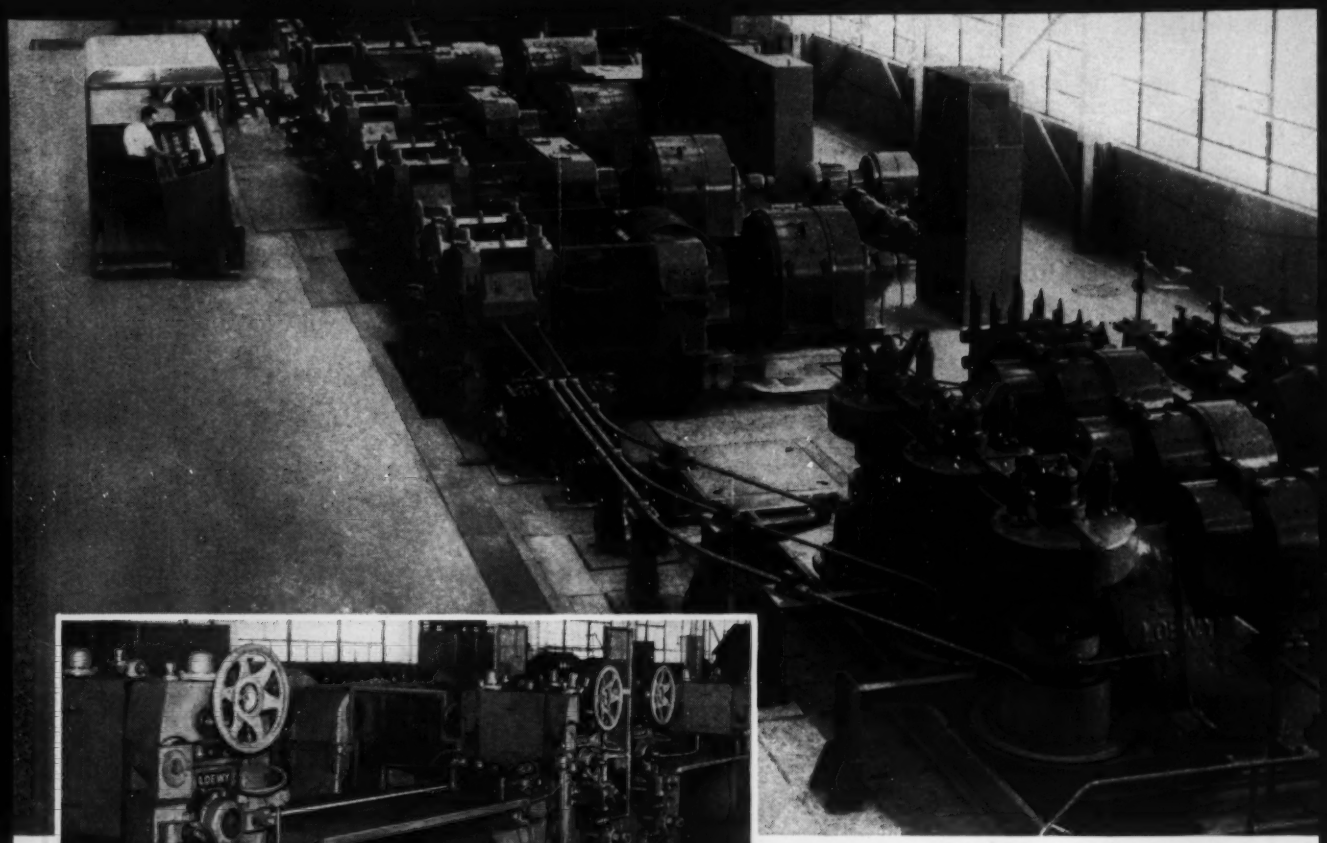
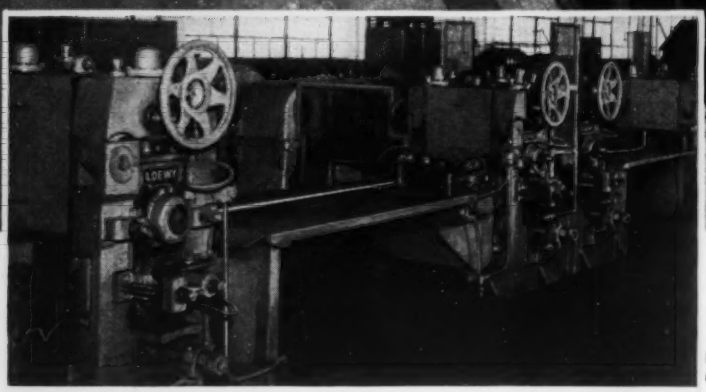


Continuous wire rod mill installation for 2-strand operation.



Part of 12- and 10-in. continuous finishing train of a wire rod mill showing entry side for 2-strand operation.

Even with inexperienced crews, Loewy wire rod mills for steel and nonferrous metals function flawlessly

This automatic rolling mill has been in operation now for one year, and its owner is well satisfied with it in every respect. In addition to the excellent products and high output obtained, he is extremely pleased with the fact that despite the inexperience of the crew assigned to it from the start, the installation has operated without difficulty.

On nonferrous metals, our wire rod mills operate at 2400 fpm and more. On steel, of course, speeds up to 6000 fpm can be obtained. Loewy rolling mills are engineered for top output, labor-saving production, and minimum maintenance.

Loewy designs, builds and installs blooming mills, slabbing mills, hot and cold strip mills, rail and structural mills, billet mills, skelp mills, merchant mills, foil mills, laboratory mills, all kinds of special mills and auxiliary equipment.

We work with you from the earliest planning stage, taking your initial concept and developing it through every phase of the project to full-scale plant operation. We also specialize in modernization of existing rolling mills. If you would like more detailed information, write us today, Dept. B-9.

Loewy-Hydropress Division

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NEWS FROM HAMILTON!

100 to 300 ton press line sets new standards

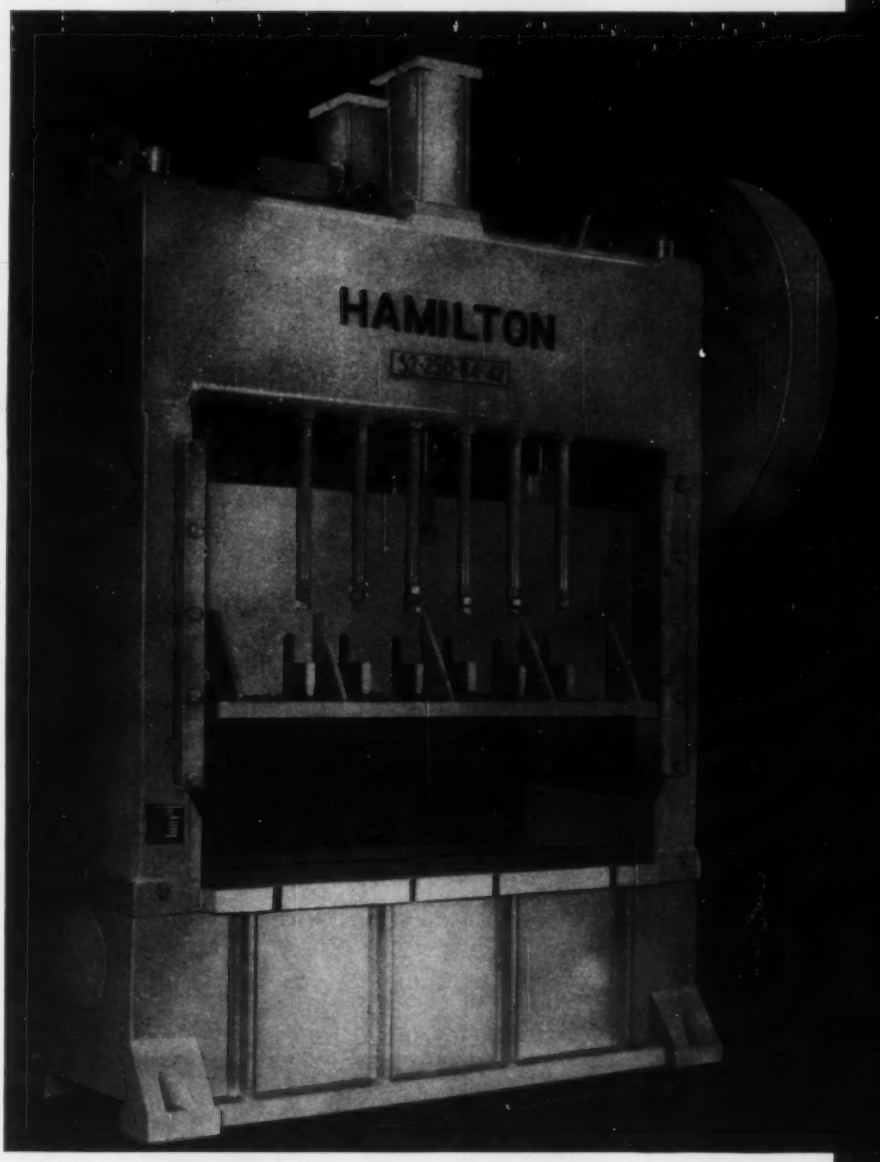
Hamilton offers you 100 to 300 ton presses built to meet exacting automotive production standards . . . standards pioneered in the automotive field through more than 30 years of Hamilton's leadership in building presses.

Every one of these 2 point, single acting, straight-side, double-crank presses is a brand new design. Each is engineered for constant top-speed, top-quality production — without profit-robbing downtime. Each is built for complete operating flexibility. Here are a few of Hamilton's design features that will mean more efficient operation for *you:*

- **mechanically interlocked air clutch and brake**
- **barrel-type motorized slide adjustment**
- **automatic lubrication**
- **pneumatic flywheel brake**
- **die lights**
- **die cushions**
- **pneumatic counterbalances**
- **interlocked electrical clutch control**

Exact specifications are adjustable to your individual requirements. Special electrical controls are available to meet particular electrical standards.

It will mean money in your pocket to find out today how these all-new Hamilton presses can help you turn out high quality stampings fast . . . without costly production downtime. Get the full story on these new 100 to 300 ton presses . . . from Hamilton Division, B-L-H Corporation, Hamilton, Ohio.



Hamilton's brand-new 250 ton double-crank press with 84 x 42 in. bed and slide.

Hamilton Division Hamilton, Ohio

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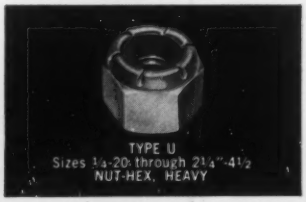
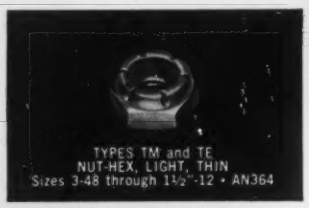
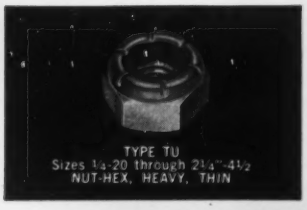
Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools

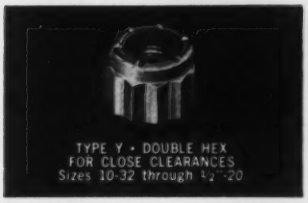
BALDWIN BLH LIMA-HAMILTON

How does ESNA's complete line turn your special hex nut requirements into standard parts?









ESNA's line of *standard* hex nuts includes so many hundreds of dimensional, material and tensile variations that, in most instances, a *stock* is available to meet your specific needs.

For example, all the nuts shown here are standard parts. Yet they range in size from a sub-miniature 0-80 thread that is only .107" across the flats to a 4"-4 thread 6-1/8" across. Thread series include SAE, USS and British BSF, BA and Whitworth series. Most are available in carbon steel, stainless, brass and aluminum. They do not gall or seize bolt threads, and they can be re-used many, many times.

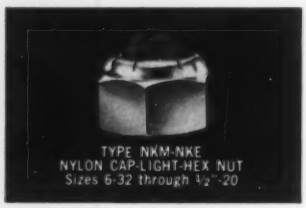
Furthermore, the effectiveness of their red locking collars has been proved by more than thirty years of rugged field service—on locomotives, pile drivers, oil drilling machinery, washing machines, trucks and tractors.

These standard ESNA hex nuts are available from stock or are produced under normal lead times. And, of course, hundreds of other "specials" are also available. For details on the Elastic Stop® nuts shown here, write Dept. N47-960.

ELASTIC STOP NUT CORPORATION OF AMERICA

2330 Vauxhall Road

Union, New Jersey



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— a complete line of grinding wheels and abrasives to meet *all* your grinding and finishing requirements.

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— skilled abrasive engineers the country over to help you solve your grinding and finishing problems.

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— distributor stocks in over 315 cities, large warehouse stocks in five cities, immense factory stocks — all backed by the production facilities of the world's largest grinding wheel plant.

In Abrasive Research
— over 180 scientists and technicians in specialized laboratories using the very latest scientific apparatus developing new and improved abrasives and bonds to cut your grinding costs.

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Plants and distributors around the world

BEHR-MANNING CO., Troy, N.Y. is a division of Norton Company

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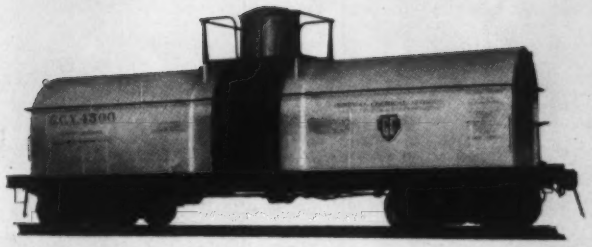

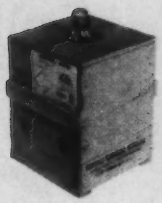

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. . . every grade, every strength!

General Chemical Production Facilities Assure Uninterrupted Service

To keep pace with constantly increasing demands, General Chemical has recently expanded the capacity of its already large-scale Nitric Acid facilities. Today, three major plants—in Buffalo, N. Y., Newell, Pa. and Hedges, Wash.—provide steady, dependable customer service.

As a prime source of supply for Nitric Acid for more than 50 years, General offers the largest selection of grades and strengths on the market. It has a knowledge of the product, its properties and applications that can be extremely helpful to every user. This accumulated experience is at your service whether your interests are in basic industrial uses or in such advanced applications as rockets and missiles.

For further information—or for any quantity from carboys to carloads—just call the nearest General Chemical office below.

ALL GRADES AND STRENGTHS, including:

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36°, 38°, 40°, 42° Baume; 95-98%

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Reagent, A.C.S.
Sp. Gr. 1.42

Red Fuming
Technical, Various Strengths of NO_2 content (with or without HF inhibitor)
Reagent, Sp. Gr. 1.59-1.60

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Technical, 97.5% HNO_3 (with or without HF inhibitor)
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Available in tank cars and tank trucks, carloads, drums and carboys.

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William Kody, American Coil Spring sales manager, watches as important product receives periodic check. An automobile window regulator clutch spring, it must be very precise. Johnson music spring wire fits product and machine.

Johnson Music Wire meets the test at American Coil Spring Company where . . .

Automation Demands Uniform High Quality

When American Coil Spring Company needed a precise music spring wire for an exacting auto window regulator spring, past experience prompted it to turn to Johnson Steel & Wire Company, a leading producer of high-carbon fine-specialty wires.

And when the same company—for 32 years one of the nation's top precision springmakers—was looking for ways to further automate its Muskegon, Mich., plant, Johnson came up with another answer—extra-sized coils of weld-free music wire to reduce machine downtime and wire handling.

One of the largest spring wire users in the United States, American Coil has a company watchword—Springs With a Pedigree. Everyone at American Coil lives up to this slogan by constantly emphasizing quality in every phase of production. This has paid off for American Coil by building a reputation for making the best of standard springs—and special springs others can't make.

Every bit of American Coil's skill comes into play on the auto window regulator spring. The spring has to have perfect diameter because it is mechanically inserted in the window clutch during an automatic assembly. Too large, and the spring won't fit. Too small, and it will cause slippage when the window is raised or lowered. Either variation in dimension will cause rejection.

To make the spring, which has three turns and is close wound with extended legs bent opposite, American Coil invented a special machine to combine the coiling and bending operations.

One-half of the challenge solved by the machine, American Coil then had to find a superior wire. Cast and peak had to be exactly as specified. Uniform dimension of .055″ X-L-O music wire had to be held, both within the coil and from coil to coil. Excellent surface was another must. Johnson's X-L-O music wire met these specifications readily. It is available in a full range of sizes between .003″ and .300″ and can be given a number of phosphate or other surface coatings.

Meeting this customer's requirements through ingenuity and good wire is a formula American Coil applied in the case of the extra-sized coils.

(Advertisement)

Springs are periodically projected onto the screen of this shadowgraph so that minute details of their conformation are compared with drawings.

Operator prepares for a run of springs for automatic bowling alley pin setters. The Johnson music spring wire that feeds this machine comes in a special 500 lb. bundle so that run will be twice as long. Downtime is reduced.

American Coil is committed to a policy of automating wherever possible. In springs requiring Johnson's .080" and larger music wire, Johnson doubled coil sizes from the traditional 250 pounds to 500 pounds without welds. This reduced storage space, simplified handling and reduced downtime on the coiling machines. Moves like this permit American Coil to achieve a daily capacity of 18 million pieces with a labor force that numbers usually 350 people.

Of the relationship between American Coil and Johnson, Works Engineer James Church of American Coil says:

"The combination of our experience in springmaking and Johnson's superior knowledge of wiremaking, results in a highly successful product."

All these advantages of Johnson's wire are available to you, no matter whether you need music wire or any of the other specialties—

Aircraft Cord Wire . . Armature Binding Wire . . . Belt Hook Wire . . . Bobby Pin Wire . . . Brush Wire . . . Gutterbroom Wire . . . Card Wire . . . Shade Roller Wire . . . Flexible Shaft Wire . . . Heddle Wire . . . Hose Reinforcement Wire . . . Hose Wire . . . Mandolin Wire . . . Piano Wire . . . Rope Wire . . . Safety Pin Wire . . . Special Shaped Wire . . . Staple Wire . . . Metal Stitching Wire . . . Signal Corps Wire . . . MB Spring Wire . . . Tire Bead Wire.

If you have an application which requires high quality and close tolerances, Johnson is ready to serve you. Call your closest district office today.

Nobody watches this machine as it produces thousands of perfectly duplicated springs. If the wire were not highly accurate in dimension and metallurgical characteristics, frequent adjustments would be necessary.

Testing for tension is a constant operation at American Coil Spring. Variations in wire quality would show up here. American is well satisfied with Johnson music wire quality.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

***a subsidiary of* Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
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(Advertisement)

halos...

for harassed engineers*

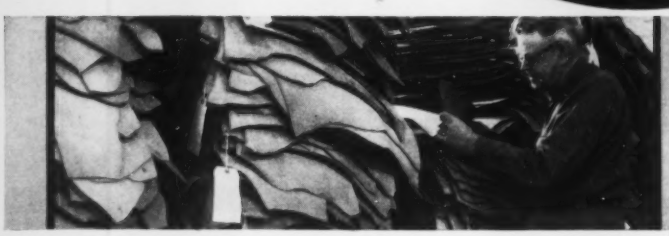
Are your leather oil seals or packings giving you headaches instead of halos? Your best cure for this situation – specify IPC.

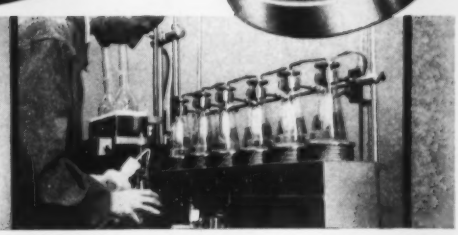
Why?

Well, because IPC specializes in the custom approach to packings problems . . . leather or synthetic. Better materials and manufacturing techniques add up to better results.

You might be amazed at the applications which are solved by IPC leather packings – plain or impregnated. Ask your IPC representative for a complete rundown . . . *today.*

**Production and maintenance folks, too!*





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Oil Seals
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IPC

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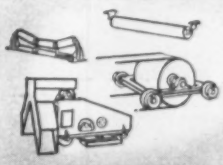
Bristol, New Hampshire P5

WHAT BUT A BELT CONVEYOR could carry this load for so few pennies a ton?

Moving at high speed—24 hours a day if required—belt conveyors handle huge tonnages in a continuous stream. Loading and unloading delays are eliminated, and there's no time lost on empty return runs. Operating costs are relatively low, based on cost per ton handled. In fact, economies of belt conveyor operation and upkeep generally top any other form of bulk material transportation. And thanks to their extreme flexibility, installation is easy even in difficult locations.

WHO BUT LINK-BELT offers such a complete belt conveyor service? For any requirement—new installation or modernization job—Link-Belt will plan it, equip it, erect it and stand behind it. Our engineers can choose from industry's most comprehensive idler line—plus a broad range of pulleys, drives, terminal machinery and auxiliary equipment. Because all drawings and equipment come from one source, responsibility is centralized . . . no need to waste valuable engineering man-hours coordinating drawings from several sources.

OVERALL ENGINEERING



COMPLETE EQUIPMENT

SKILLED ERECTION

ASSURED SATISFACTORY PERFORMANCE

Add to the basic economies of belt conveyors the extra advantages offered by Link-Belt—it's a formula producing lower costs per ton for all industry. Your nearby Link-Belt office can furnish complete information.

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LINK-BELT

BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs.

the New Rockford Tracer Lathe . . .

with hydraulic KOPY

- KAT DUPLICATOR

. . . is the greatest value ever offered in a tracer lathe. Forty years of building fine lathes and 25 years of hydraulic duplicating experience make an unequalled combination. Extreme accuracy of duplication, coupled with enough ruggedness to utilize the full horsepower of the machine, make Rockford Tracer Lathes the preference for repetitive turning in any volume.

The Rockford Tracer Lathe can be converted to a completely standard engine lathe in a matter of minutes, thus adding to its versatility and flexibility for small lot production.

Complete interchangeability of multiple diameter work can be achieved by unskilled operators at production speeds comparable to turret lathes. These machines are rugged enough for heavy production work, yet flexible enough for tool room or job shop production.

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PLUS FEATURES

Duplicating attachment designed and built by the lathe manufacturer specifically for Rockford Lathes. No divided responsibility.

Kopy-Kat Valve features proven accuracy, precision manufacture, built-in retract.

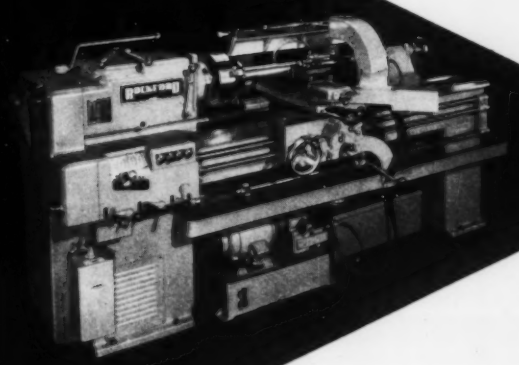
Power unit requires no additional floor space - includes sealed unit, compensating pump and filter.

Electrical controls are combined and interlocked with machine controls from centrally located push button station.

European tool post.

All hydraulic lines are clear of chips and coolant - out of the operator's way.

Automatic feed cut-out - a standard feature on Rockford Tracer lathes.



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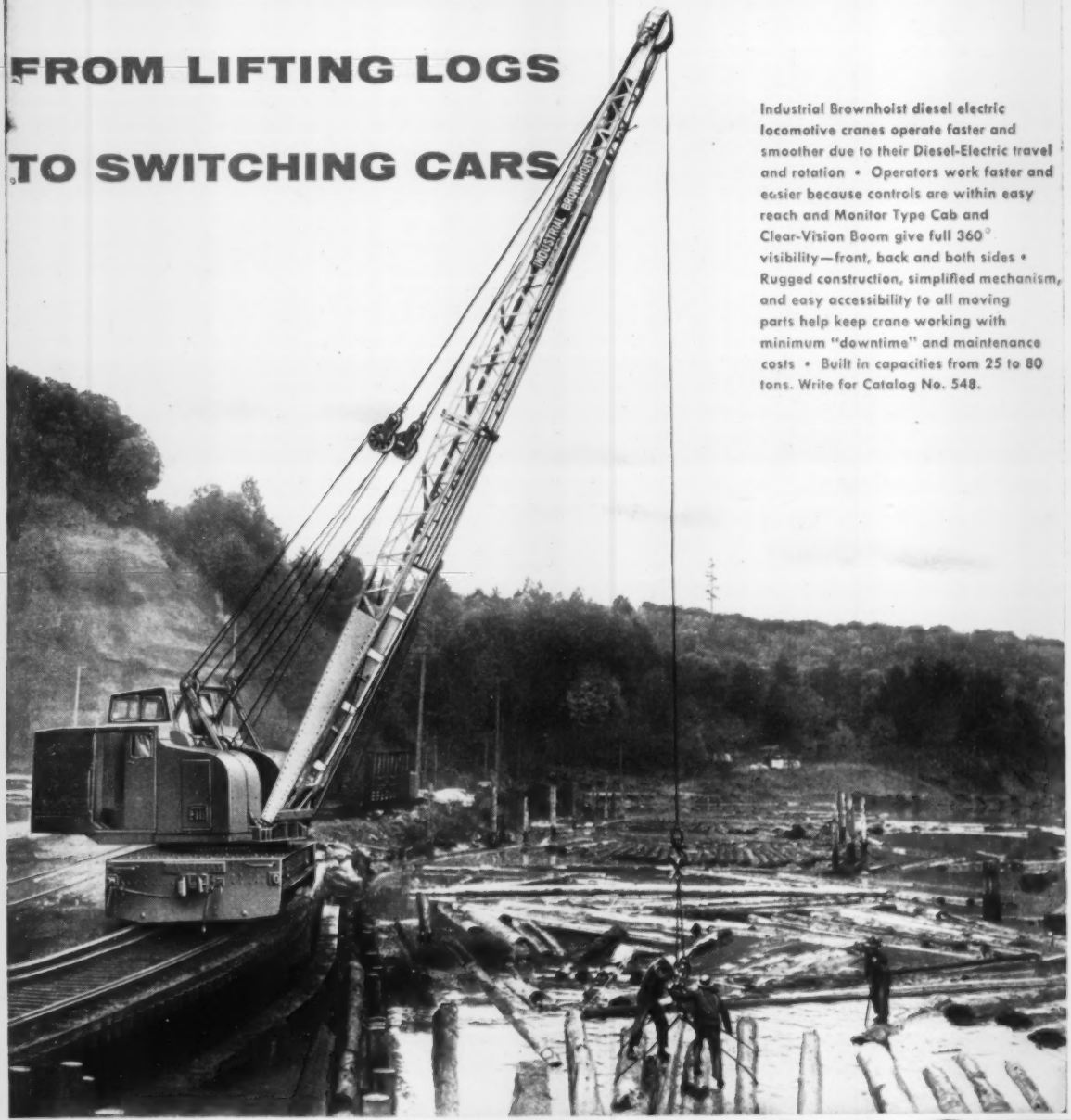
WHY INDUSTRIAL BROWNHOIST LOCOMOTIVE CRANES SPEED UP JOBS FROM LIFTING LOGS TO SWITCHING CARS



Industrial Brownhoist diesel electric locomotive cranes operate faster and smoother due to their Diesel-Electric travel and rotation • Operators work faster and easier because controls are within easy reach and Monitor Type Cab and Clear-Vision Boom give full 360° visibility—front, back and both sides • Rugged construction, simplified mechanism, and easy accessibility to all moving parts help keep crane working with minimum "downtime" and maintenance costs • Built in capacities from 25 to 80 tons. Write for Catalog No. 548.

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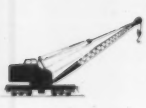

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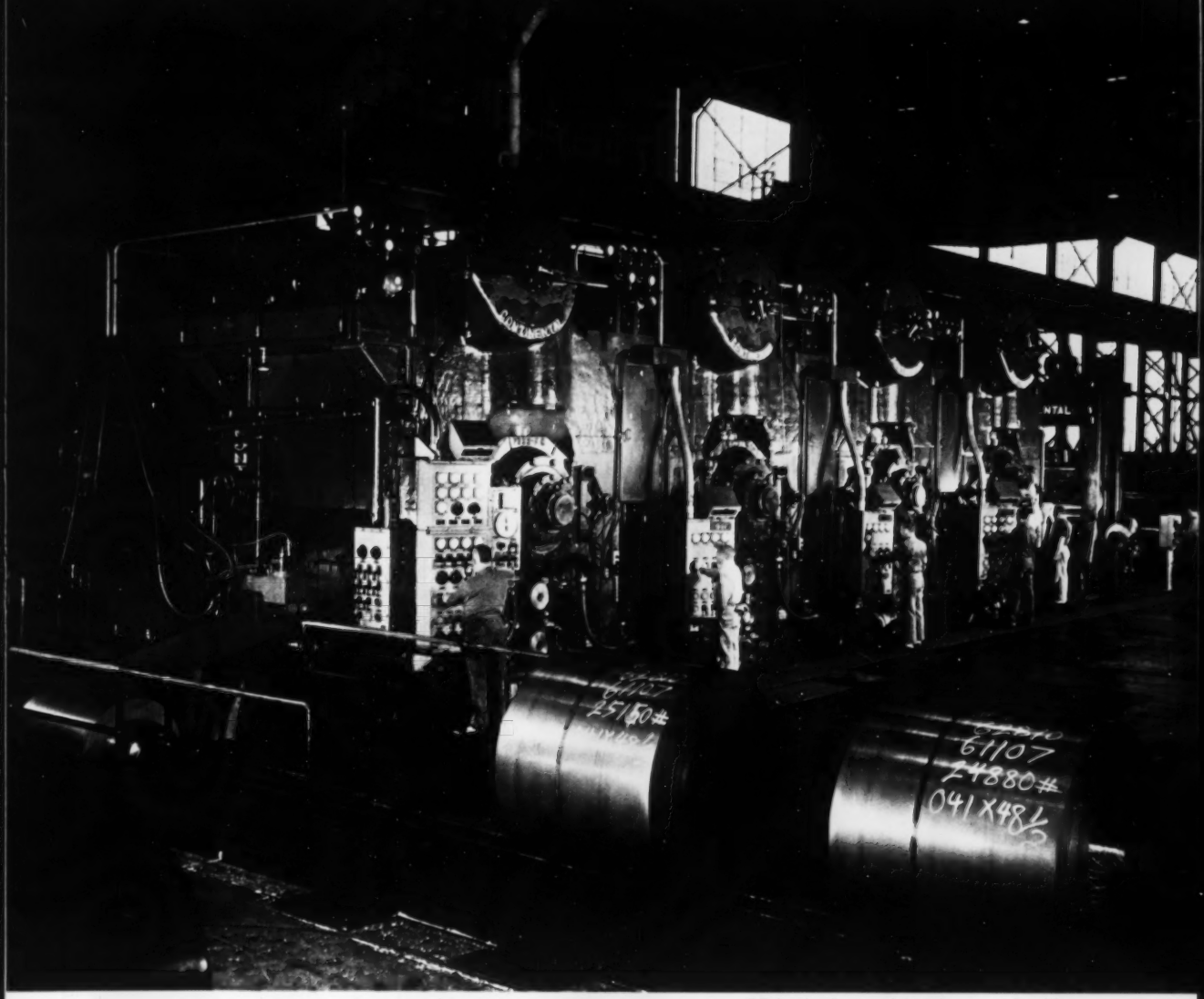

60-inch, 4-stand tandem cold mill

BLAW-KNOX COLD STRIP MILLS

Blaw-Knox designs and builds all types of cold reduction and temper mills for ferrous and non-ferrous work. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

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Foundry and Mill Machinery Division
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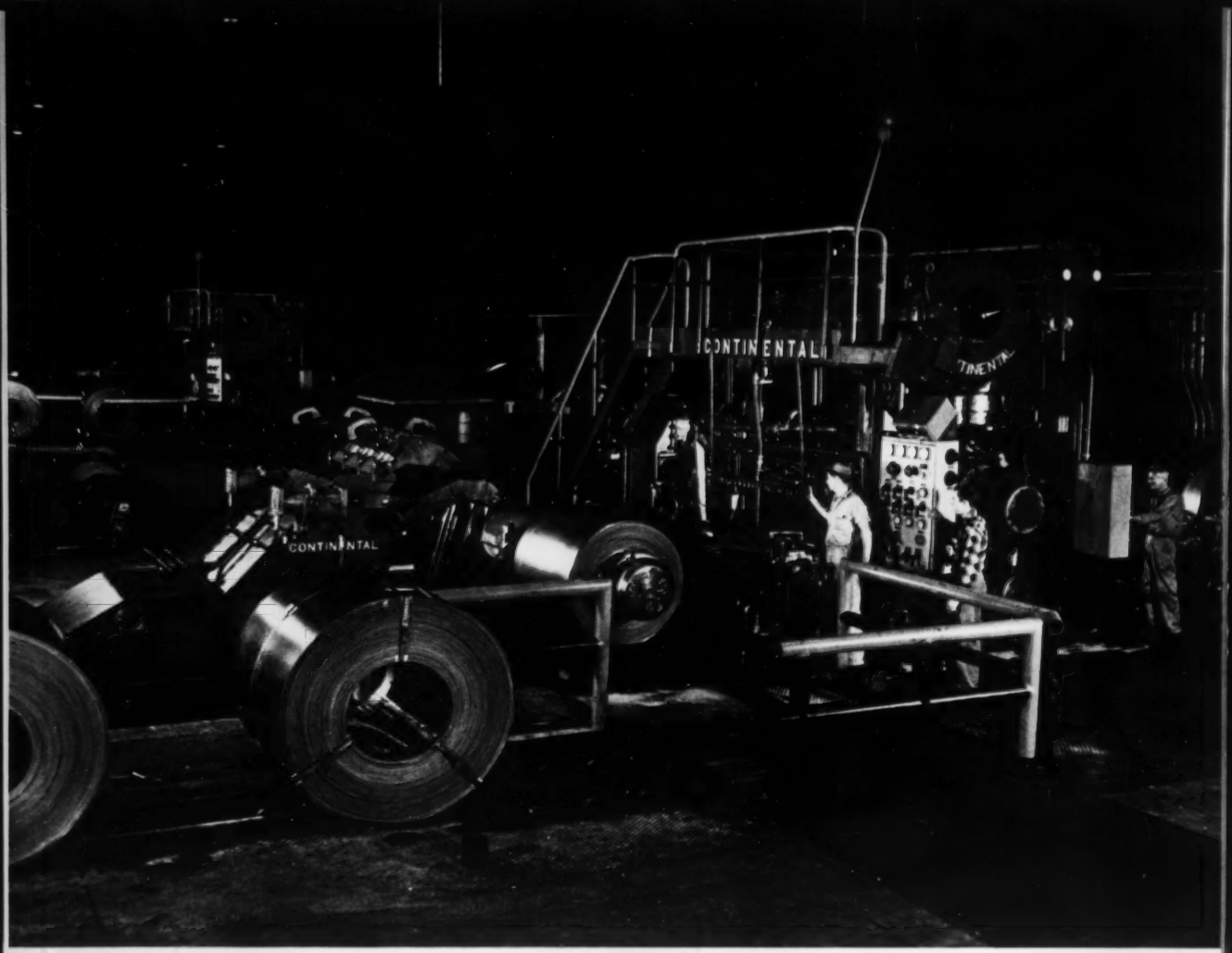

60-inch two-high temper mills. They are fed from the annealing building by a downender to floor level entry conveyor. Delivery conveyor is also at floor level.

BLAW-KNOX TEMPER MILLS

Blaw-Knox designs and builds a full range of Temper Mills for integration into your strip and sheet processing operation. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron, and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

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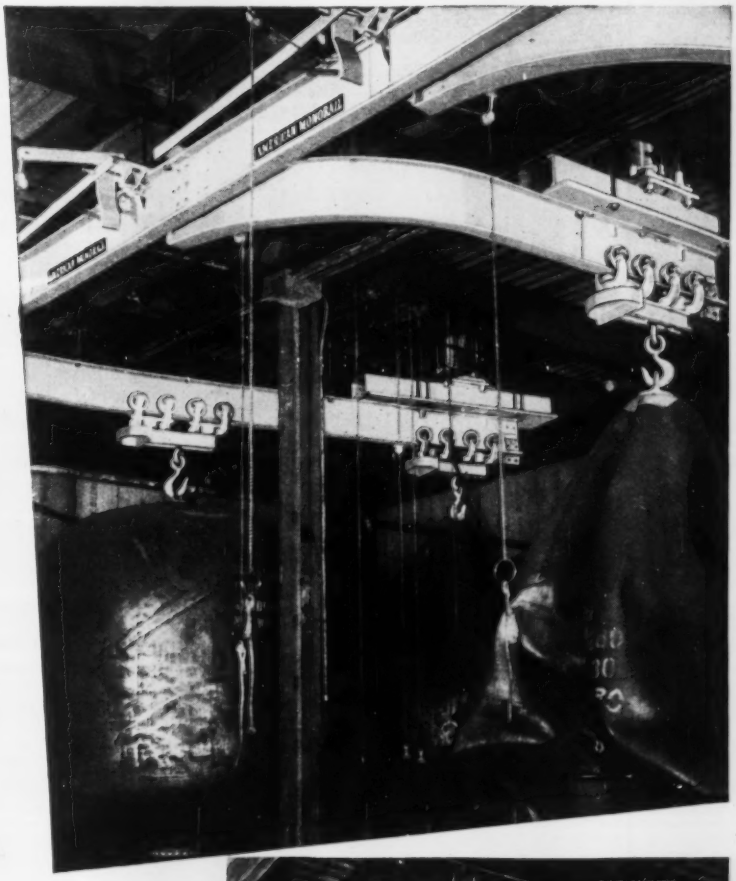

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The Sealdbin containers, a product of U. S. Rubber Co., each hold 11,000 pounds of costly carbon black. This American MonoRail System moves the Sealdbins from flat cars or trucks to special stations for discharge. Empty deflated containers are returned to the supplier for re-use.

Working together this expert team has minimized manual labor, time, and waste.

If you have a materials handling problem, call your nearby MonoRail Engineer or write us.

Send for Bulletin C-1.

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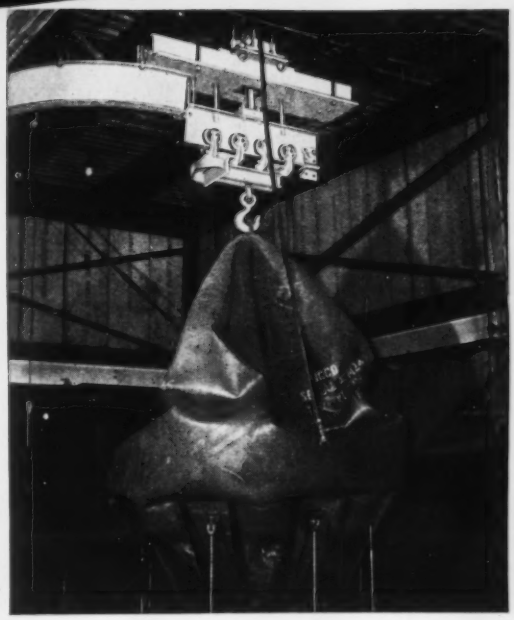

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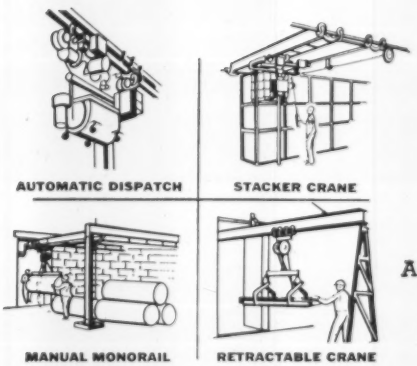

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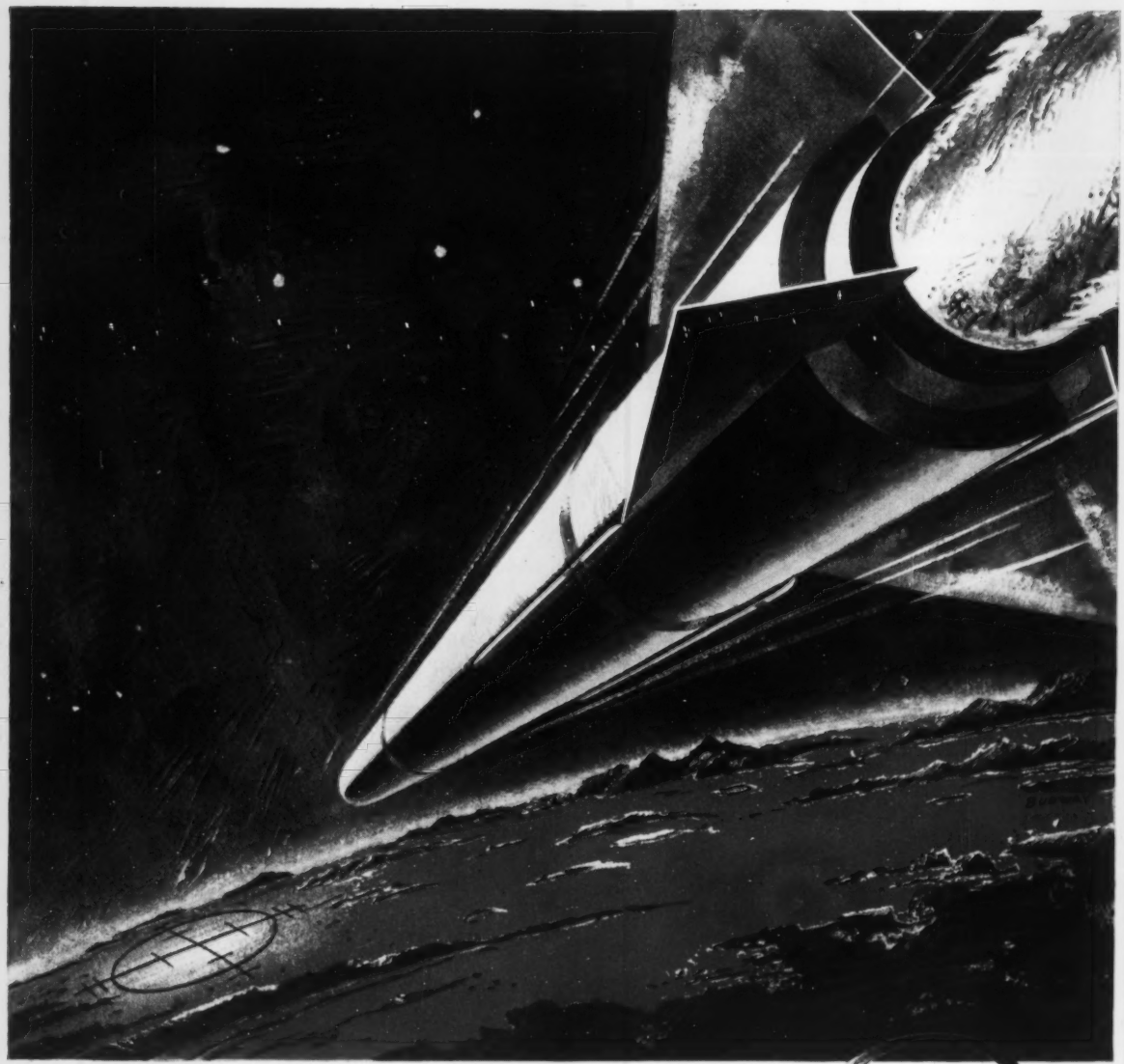
(IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)



Amweld® Hits Your Cost Target

Forming and flash butt-welding of mill-rolled or extruded shapes has cut the cost of rings and other circular parts by as much as 50%! Savings to one manufacturer in reduced machining time and material was $220.63 per ring. Where expensive metals such as titanium and heat-resistant alloys are used, flash butt-welding offers the most economical and practical method of manufacturing circular products.

Similar economies are also realized on carbon steels and less expensive metals.

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AMERICAN WELDING
The World's Leading Manufacturer of Welded Rings

Metalworking Outlook

UAW Strike Fund High

The United Auto Workers are building toward a record strike fund to fight for their 1958 demands. The total is now $23 million. It could easily pass the previous peak strike fund of $25 million amassed for the 1955 auto negotiations. A special assessment, such as the $5 monthly levied in 1955, would quickly bring in more than $2 million. That extra levy may be voted next Jan. 22 in Detroit when the union holds a convention to formulate 1958 demands.

Alcan Ends Strike

The four-month strike at Aluminum Co. of Canada's Arvida, Que., reduction facilities ended last week when 6500 workers accepted a three-year wage package that will add 45 cents an hour to their pay. An estimated 120,000 tons of production have already been lost, and more will go down the drain because several weeks will elapse before normal production can be reached. The pact calls for a 26-cent boost the first year, 9 cents in the second, and 10 cents in the third.

New Push for Right-To-Work

The Senate's labor investigations will give a new push to right-to-work laws. Eighteen states now have them, but Indiana is the only one that's extensively industrialized. The National Right-To-Work Committee, headed by former New Jersey Congressman Fred Hartley, expects strong movements against the union shop to develop in Ohio and Kentucky. A referendum on the issue may be held in Idaho whose Senate narrowly defeated the measure early this year. Kansas has a referendum scheduled on the subject for 1958.

Coming: Round 2 in Cutbacks

Round 2 in defense cutbacks may be announced this week. First hint came last week with the Navy's cancellation of the Triton project, a surface-to-surface missile. Some $8 million was to have been spent on it in fiscal 1958, and $24 million has already gone for development. The prime contractors involved: McDonnell Aircraft Corp., St. Louis; Goodyear Aircraft Corp., Akron; and Kearfott Co. Inc., Clifton, N. J. The Navy's Regulus II, competing with the Triton, will be continued. The first round of cutbacks in defense spending hasn't even achieved a $40-billion annual spending rate. The goal is to whittle down to $38 billion.

Aluminum Contracts Revised

General Services Administration and the three major aluminum companies have signed agreements revising the controversial aluminum supply contracts. Aluminum Co. of America, Kaiser Aluminum & Chemical Co., and Reynolds Metals Co. modify the 1950-52 contracts in these four main ways:

1. Producers agree to deduct from their production figures any primary metal purchased from other sources. (Alcoa and Kaiser import primary from Canada; Reynolds doesn't.) 2. Metal delivered to the U. S. shall average 99.6 per cent purity instead of the lower minimum, 99 per cent. 3. Aluminum will now be sold to the government at the price prevailing at the time of production instead of at the time of shipment. 4. The amount of expanded capacity earmarked for nonintegrated users is increased to 35 per cent, from the original 25 per cent. Some 230,000 tons a year will be available to independents. The revisions could save the government as much as $98 million.

New Hope for Farm Tools

Upturn coming for farm equipment makers? The Agriculture Department estimates farmers' realized net income in the third quarter may run as much as $500 million higher than the seasonally adjusted annual rate of $12.1 billion of a year earlier. The improvement is already reflected in some farm equipment makers' sales. International Harvester Co.'s tractor sales for the first nine months of this year are 7.4 per cent ahead of the 1956 pace, and farm implement volume for the third quarter is 21 per cent over what it was in the same period of 1956.

More, but Smaller, Households

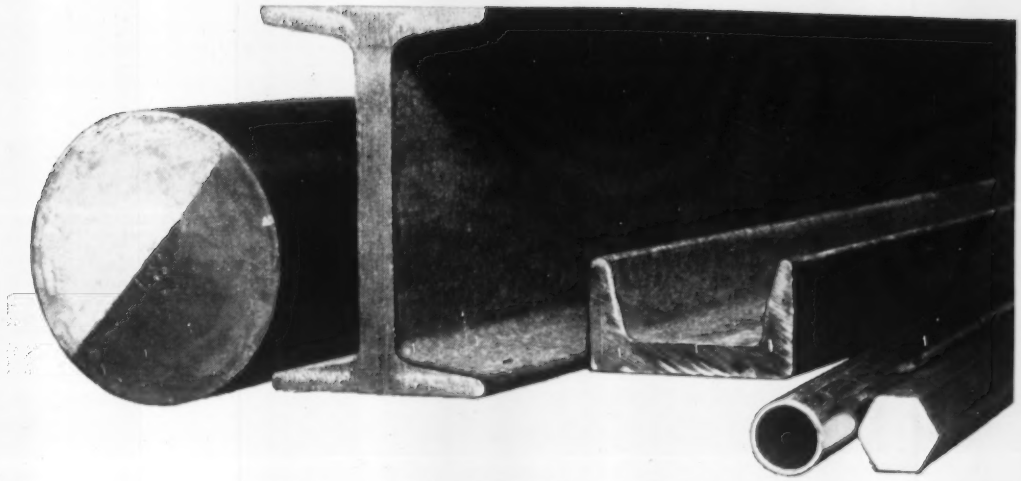
We're forming more households with fewer persons. In 1930, the average household had 4.1 members. Today, it has 3.34. Consumers also are spending more for housing and operation of their households. In 1956, 25.8 per cent of their total expenditures went to maintain their homes, highest in history.

Small Business Ills Studied

What's wrong with small business? In connection with the President's conference on small business, beginning today (Sept. 23) in Washington, three groups were asked to rate the basic troubles of small firms. Executives from large companies put research and development at the top, personnel and finance next. Government leaders said finance was first; personnel and research followed. Small businessmen thought finance led the list; personnel, sales, and research next. All three groups put production problems and government relations at or near the bottom.

Straws in the Wind

Federal Reserve Board's seasonally adjusted production index held at 144 per cent of the 1947-49 average in August, same as in June and July . . . Reynolds' decision to shift its general sales office from Louisville to company headquarters in Richmond, Va., means the end of plans to build a research center and office in the Kentucky city . . . The Senate labor hearings start on the teamsters again tomorrow (Sept. 24) . . . Rumor of the week: More B-52 production cuts are coming.



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3 major reasons keep them coming to Ryerson:

Flame-cut steel shapes save you money—
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1. Biggest stocks—nobody comes even close to the size and variety of Ryerson inventories.

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3. Dependable, certified quality—at fair prices—whether steel is plentiful or scarce.

RYERSON STEEL

PRINCIPAL PRODUCTS IN STOCK

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The PROOF of DSC STEEL is in its PERFORMANCE on your job

Say you are a fabricator of stampings* that are *chrome-plated* after having been *formed and/or drawn* out of Flat Cold Rolled Steel—

Here's HOW DSC DEEP-ROLLED RBF STRIP Can Cut Your Fabricating, Polishing and Chrome-Plating Costs

HAVE YOU CHECKED YOURS LATELY?

Using *non-strip* material for the kind of work mentioned above? Then there is a possibility that your fabricating, polishing and chrome-plating costs may be greater than need be. At least that has been the experience of typical DSC customers before they switched to DSC DEEP-ROLLED RBF STRIP.

WHAT MAKES DSC DEEP-ROLLED RBF STRIP DIFFERENT

Simply stated, it's the way it is made. Even though we explained it completely, we would hardly expect to convince you by ad talk. You have to see the difference yourself . . . *on the job*. We'll make it easy for you to make a test anytime you say.

WHAT YOU'LL DISOVER IN A TEST

DEEP-ROLLED RBF brightness isn't likely to break out in a "pepper and salt" rash, even under severe deformation. Rejects and breakers are practically nil. Your plating dollar will go further . . . and give you a better looking product in the bargain.

WHAT DEEP-ROLLING DOES

RBF STRIP is "The Sure-Working Steel with Eye-Appeal." Its quality comes from the *depth* of cold reduction it gets . . . on bright rolls *all the way, from first pass to last* . . . besides, of course, a final bright pass in temper mills.

That's why RBF brightness is more than "skin deep." And Deep-Rolling, the DSC way, improves grain structure, gives the steel deeper, surer working advantages.

WHAT DSC DEEP-ROLLED RBF STRIP OFFERS YOU

RBF STRIP is a product of 35 years of successful stripmaking. But we don't claim it to be a cure-all. We do say this—when RBF is *compatibly* mated to a job of yours, it offers you the opportunity for appreciable savings in your *over-all or job-run* costs.

Among DSC customers who are benefiting in this way are manufacturers of auto radiator grilles, mouldings, accessories; toasters, broilers, other small appliances; major appliance hardware and trim; housewares and other eye-appeal products.

HOW DSC WORKS

THE JOB FACTS COME FIRST. A DSC Customer "Rep" sees you about the possibilities. You decide whether you want your operating people to meet ours . . . and when. The closer the team work, the better the results.

How about getting started . . . real soon?

**Also tubing, mouldings and other roll-formed products.*

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Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

AMERICA AND STEEL MUST GROW TOGETHER — STEEL CENTENNIAL 1857 1957 — DETROIT DSC STEEL

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DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

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Are Workers Really Scarce?

We keep hearing so much about the shortage of skilled people at all levels in industry that we are wondering whether we are doing all we can to solve the problem.

Aside from the "learn to do with what you have" programs, constructive advice is noticeable for its absence.

The total work force (both sexes) will increase from 68 million in 1955 to 88.6 million in 1975, or 30 per cent.

But the increase in the vital 25 to 45 male age group will increase only 17 per cent (22.2 million to 26.1 million) in the same 20-year span. From 1955 to 1970, the gain will be only 5 per cent.

At the same time, we will have the expanding needs of a population that will be 30 per cent larger in 1975 than it was in 1955—165 million vs. 221.5 million.

Even with more automation and the technological miracles we can expect to come along in the next few years, we won't be able to realize our industrial potential as a nation unless we can think of more ways to make the best use of our work force.

As a starter, we suggest a critical review of industrial relations policies relating to present employees and the recruitment of new ones. Particularly, look for practices that may be outmoded.

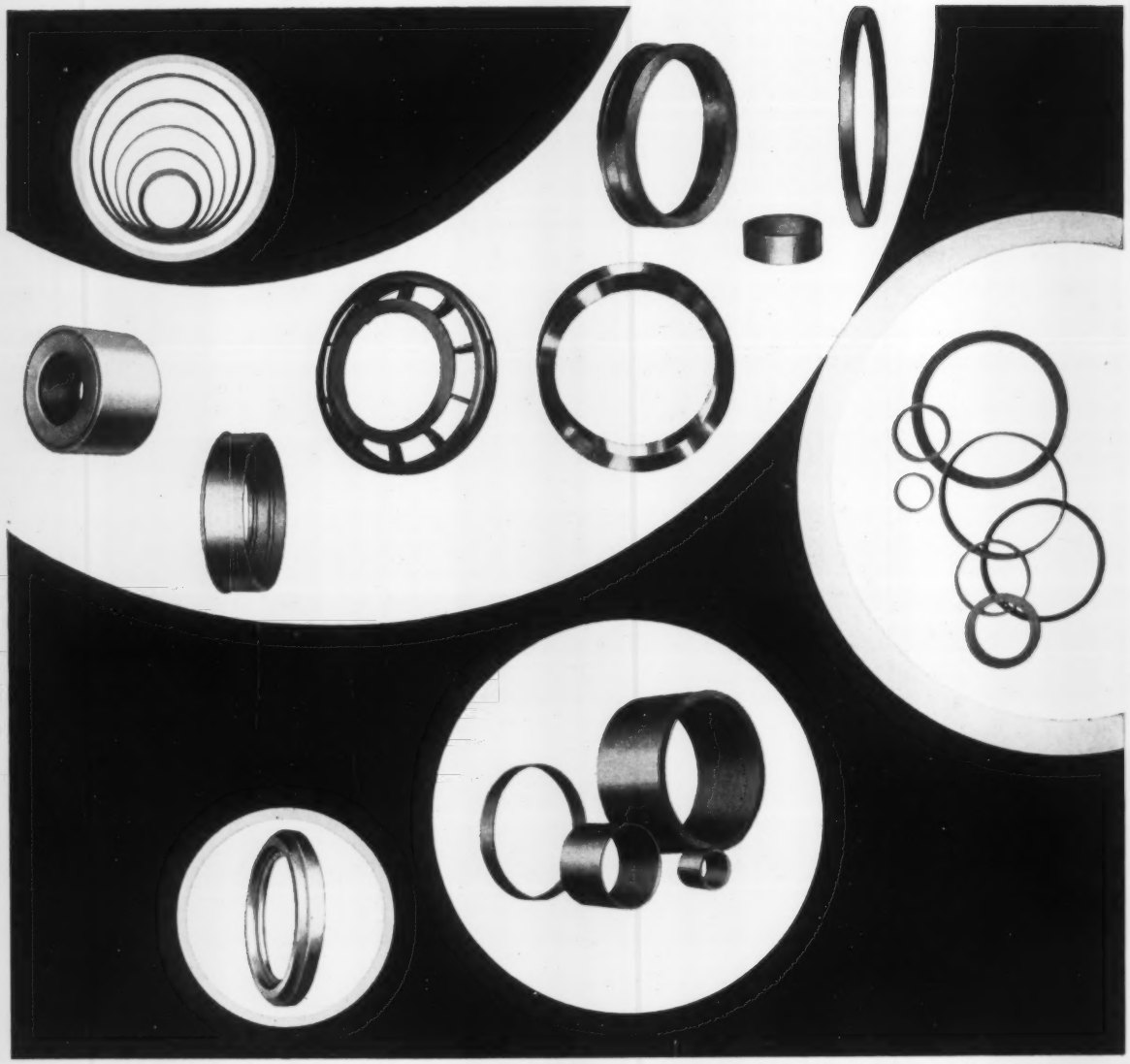
Two merit careful study:

1. Compulsory retirement at 65. (While many people at this age want to and should retire, others still have some of their most productive years ahead of them.)

2. The almost automatic disqualification of job candidates in their forties and fifties, regardless of their experience and knowhow. (Because of changes taking place within many businesses, a number of these people find themselves on the street through no fault of their own.)

Such so-called seniors give us a golden opportunity to alleviate some of the shortage of workers.

Irwin H. Such
EDITOR-IN-CHIEF



IF THE PROBLEM IS CIRCULAR . . . BRING IT TO CLEVE-WELD

If you now use circular parts that are cast or forged, or if you are planning a new circular component, consider the Cleve-Weld Process for three reasons:

1. We can cut your waste costs up to 30% over bulky cast or forged parts.
2. We can eliminate excessive machining by designing sections suitable to your needs.
3. We can, consequently, help you speed your over-all production and cut costs further.

Where expensive alloys and "wonder metals" are involved, we may be able to save you enough in waste and machine time to pay for the finished part.

Our proposition is simple. We have 45 years of design, metallurgical and production experience that can probably save you money. To find out, call, or write and send drawings to: Circular Welded Products Department, Cleveland Welding Company, West 117th Street and Berea Road, Cleveland 11, Ohio.

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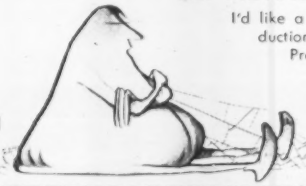
CLEVELAND WELDING DIVISION
AMERICAN MACHINE & FOUNDRY COMPANY
Cleveland 11, Ohio



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I'd like a brochure on Cleve-Weld's metallurgical, design and production facilities. Particularly, I'd like to know how the Cleve-Weld Process can cut component costs while improving performance.

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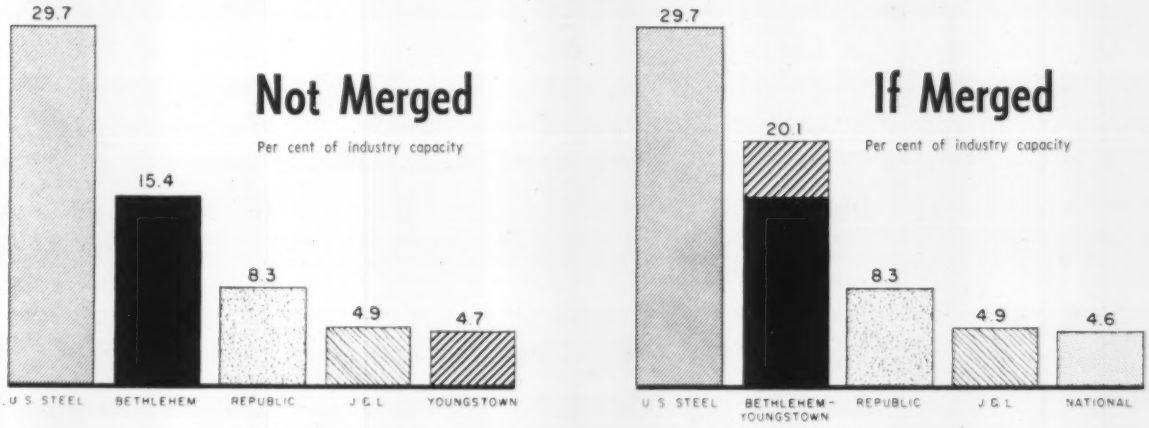
TITLE_____

ATTACH TO YOUR COMPANY LETTERHEAD AND MAIL TODAY!

How Merger Would Affect Ingot Capacity Line-Up

(As of Jan. 1, 1957)



We'll Expand, If—Bethlehem

Reasons why the merger should be permitted are presented by Bethlehem and Youngstown. They'll add 2.6 million ingot tons to capacity if the marriage goes through

BETHLEHEM STEEL Corp. revealed major expansion plans for Youngstown Sheet & Tube Co. plants if the courts allow the two to merge. Disclosure came last week as the two companies gave their reasons why they should unite.

Arthur B. Homer, Bethlehem's president, announced that his company will spend $358 million if the merger is consummated to increase the capacity of Youngstown's plants by 2.6 million ingot tons. Most of the money, $268 million, will be spent at East Chicago, Ind., to expand finishing capacity for sheared plates, structurals, hot-rolled bars, and rolled steel wheels. The remainder will be invested in additional facilities at Youngstown for hot and cold-rolled sheets. The proposed expansion would give Bethlehem-Youngstown a capacity of 29.3 million tons, about 10.3 million tons less than U. S. Steel Corp. has now.

Legal Route—Bethlehem's plans were outlined in affidavits filed Sept. 16 in the U. S. District Court in New York. As defendants in a civil suit brought by the government, Bethlehem and Youngstown were required to answer the Justice Department's motion for summary judgment—a court order barring their merger. In a 103 page affidavit filed June 13, the government sought to prove that consolidation of the companies would violate Section 7 of the Clayton Antitrust Act. Section 7 forbids mergers which would lessen competition or tend to create a monopoly.

Answering papers filed on behalf of the two firms included affidavits by Mr. Homer, C. H. H. Weikel, manager of Bethlehem's department of commercial research and industrial development, and George McCuskey, Youngstown's vice president for finance. They also included affidavits by four economists: Dr. A. D. H. Kaplan of the Brookings Institution; Dr. John P. Miller, professor of economics, Yale University; Dr. Ben W. Lewis, professor of economics, Oberlin College; and Dr. Paul W. Cook Jr., faculty member at the Graduate School of Business Administration, Harvard University.

Reasons for Merger—Summarizing reasons for the merger, Messrs. Homer and McCuskey point out that the industry is under constant pressure to provide enough steel for an expanding economy; that the greatest growth in demand for steel products during the next 20 years will occur in the midcontinent area, in the region which has Chicago as its center; that Bethlehem cannot be a substantial factor in serving that area from its east coast and west coast plants; and that Youngstown lacks the resources to carry out an expansion on the scale required.

Speaking for the government, Harrison F. Houghton, a Justice Department economist, warns that the merger would make a big business even bigger, increasing Bethlehem's assets from $2.1 billion to $2.7 billion. What's more, he says,

GOVERNMENT'S CASE:

• Justice Department opposition to the merger of Bethlehem and Youngstown is based largely on statistics of national capacity. The government points out, for example, that the merger would raise Bethlehem from third to first in capacity for cold-rolled sheets.

Also, consolidation of the firms would give Bethlehem top capacity for hot and cold-rolled sheets in two important areas—the northeastern states and the Chicago production district. To support its claim that the merger would reduce competition, the government shows that both companies ship the same products to the same states.

U. S. Argues in Terms of "National Markets"

it would raise Bethlehem from third to first in capacity for cold-rolled sheets, increase Bethlehem's position as the company with the nation's largest capacity for concrete reinforcement bars, and make Bethlehem-Youngstown the largest seller of oil field equipment in the U. S. Bethlehem would move from third to first in galvanized pipe, from fourth to first in buttweld pipe, and from fifteenth to seventh in cold finished bars. The merger would increase concentration and tend to create a monopoly, Mr. Houghton concludes.

Market Debate—In defense of the merger, Mr. McCuskey contends that national capacity figures are of little importance in evaluating the competitive position of a firm because there are no national markets for steel products. The high cost of transportation necessarily limits the geographic area in which a particular steel plant can effectively compete, he maintains.

On Common Products—To support his claim that a consolidation of Bethlehem and Youngstown would reduce competition, Mr. Houghton points out that three plants in the same area make similar products. Both the Lackawanna, N. Y., plant of Bethlehem and the Ohio works of Youngstown turn out hot and cold-rolled sheets, hot-rolled bars, cold-finished bars, wire rods, and sheared plates—and presumably sell in the same market. Bethlehem's plant at Johnstown, Pa., produces hot-rolled bars, wire rods, plain wire, and sheared plates.

On State Shipments—Mr. Houghton's figures for shipments of sheets and strip indicate that in 1955 Bethlehem delivered 975,654 net tons to Michigan; in the same year, Youngstown shipped 227,182 tons to that state. Bethlehem's shipments to Ohio were 199,261 tons, while Youngstown's shipments were 573,243 tons.

In 1955, Texas bought 20,959 tons of buttweld pipe from Bethlehem and 34,920 tons from Youngstown. Pennsylvania bought 45,013 tons from Bethlehem and 10,057 tons from Youngstown.

Analyzing this situation, Bethlehem says individual states aren't separate markets. Dr. Miller adds: "In those areas where the two companies now sell common products, the statistical effect of the merger is not large. The sales by at least one of the two companies is in each case a minimal part of its total output, and the combined sales of the two companies is in each case a small part of the total market.

"In all cases, there are several other sources of supply equally well or better situated, the sales of which are much greater than the combined sales of Bethlehem and Youngstown. Moreover, it is Bethlehem's intention to increase its capacity, not to decrease it. In these circumstances it is not apparent how the elimination of one supplier will lead to a restriction of supply, significantly affect the competitive forces in the market, or inconvenience customers."

Relation to U. S. Steel—While the government's affidavit dwells at length on the size of Bethlehem and Youngstown and their respective positions in the industry and in selected areas, small attention is paid to a competitive feature of considerable significance—the size

BETHLEHEM'S CASE:

• Arguing that there is no national market for steel products, Bethlehem divides the country into three marketing regions — western, midcontinent, and eastern. Freight rates determine the buyer's choice of a supplier, says Bethlehem. So Youngstown, with plants in midcontinent, and Bethlehem, with plants in the East and the West, compete little.

Concentration figures for districts, such as Chicago plus the northeastern states, are unimportant because that combined area doesn't represent a single market. It's erroneous to assume that competition exists in every instance where the companies ship products of the same class to the same state.

and position of U. S. Steel.

"The position of U. S. Steel in the midcontinent area, where Bethlehem will succeed to ownership of Youngstown's plants, is much stronger than is indicated by its nationwide position," says C. H. H. Weikel. "Ownership by Bethlehem of Youngstown's plants in the midcontinent area would not immediately change the relative position of U. S. Steel, but it would bring into the area another company having financial and managerial resources sufficient to enable it to compete effectively. That would have particular significance in the production and sale of heavy products such as plates and structurals, which only U. S. Steel in midcontinent now produces in a full range of sizes and shapes."

Formal arguments on the Justice Department motion for a summary judgment will begin Nov. 4, and it's possible that a decision will be handed down by December. If the government wins, the matter will be carried by the defense to the Supreme Court, a move which would involve at least another year before a decision.

Eaton Forms Ore Combine

Clevelander sets up international group including Krupp, three other German firms, U. S., and Canadian companies to invest $200 million in northern Quebec

AN INTERNATIONAL combine to develop huge Canadian iron ore deposits at Ungava Bay, Que., is expected to begin operations soon.

Sparked by 73-year-old Cyrus S. Eaton, Cleveland industrialist and financier, the venture was clearing its last hurdles late last week in detailed arrangements with the government of Quebec, owner of the 760 square miles involved.

Krupp Included — Four West German steelmaking firms will share in the operation and will take shipments of ore. Alfried Krupp, head of the Krupp organization, headquartered at Essen, is visiting Canada to participate in discussions concerning the venture. Production is planned to start by 1961.

Other interested German companies are Mannesman Rohrenwerke of Dusseldorf; Hoesch Bergwerk of Dortmund; and Huettenwerkoberhausen of Oberhausen.

Corporations involved in the partnership include Steep Rock Iron Mines Ltd., Premium Iron Ores Ltd., Atlantic Iron Ores Ltd., and International Iron Ores Ltd., all of Canada, and Cleveland-Cliffs Iron Co., Cleveland. Mr. Eaton has an interest in all five.

An estimated $200 million will be invested by the Eaton group to exploit a reserve geologists believe to contain "at least 1.5 billion tons of open pit crude ore." Eaton engineers believe that this 35 per cent ore can be upgraded to 65 per cent by concentration.

Competitive—Ungava Bay is ice-free about 120 days a year, but Rype Island, Greenland, 600 miles to the northwest, is a year-round port.

Eaton engineers expect to make the upgraded Ungava Bay ore competitive with the output from the richer Quebec-Labrador deposits by stockpiling ore at Rype Island during the shipping season. It will be shipped to European markets throughout the year.

Mr. Eaton, born on a Canadian farm, started his career in Cleveland as an errand boy for the late John D. Rockefeller. He has invested frequently in the development of Canada, having organized the exploitation of Steep Rock mine in western Ontario in 1944.

Ore Rush on in Canada

Prospecting is booming in Canada. The modern prospector uses helicopters and airborne magnetometers instead of spade and pan.

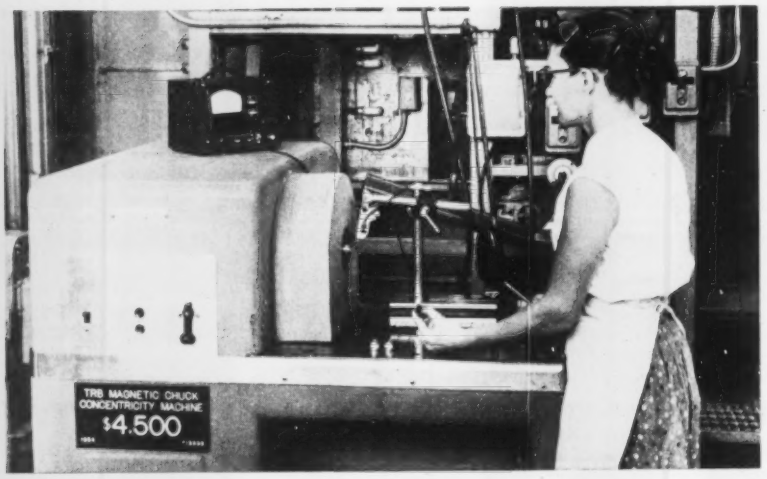
And he is looking for iron, nickel, and copper ores which will be more valuable than gold in meeting the growing demands of an expanding civilization.

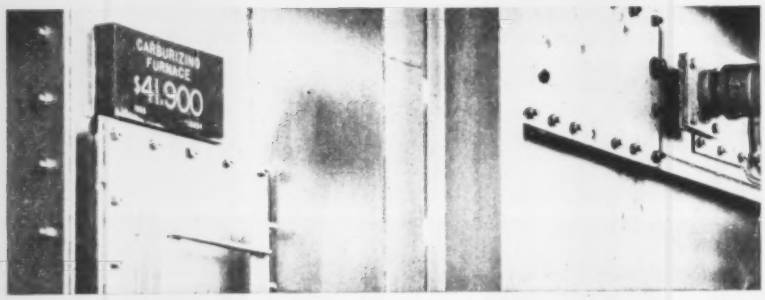
The Ungava Bay area of northern Quebec and Baffin Island, which extends above the Arctic Circle, were scenes of busy activity this summer. In addition to the Eaton group (see above story), Ultra Shawkey Mines Ltd., Toronto, is planning to develop a large iron ore deposit on Baffin Island.

Long Operation—Ultra Shawkey says the field, which preliminary tests show to be 30 to 40 per cent iron, will produce 5 million tons annually for 20 years. An estimated $200 million will be invested.

Oceanic Iron Ore Ltd., a subsidiary of the British Rio Tinto organization, holds claims on 119 square miles in the same area, about 1600 miles north of New York. Diamond drill tests were conducted this summer to determine the feasibility of development.

South of Ungava Bay, near Gerido Lake, other prospectors are conducting extensive explorations for nickel and copper. Near the Wakeham River on Ungava Bay, Asarco Nickel Co. Ltd., subsidiary of American Smelting & Refining Co., is diamond drilling for samples of nickel ore. Some 30 other companies have field crews in the same area.





Signs on expensive equipment help . . .

Workers See Machines' Cost

PRICE TAGS permanently attached to machine tools at the Bucyrus, Ohio, plant of Timken Roller Bearing Co. give employees an above average respect for the equipment they work with.

Before the machines were marked, operators were asked how much they thought they cost. "Well, I wouldn't be surprised if it cost a couple of thousand dollars," was the common estimate for a $25,000 machine. All skepticism disappeared when original invoices were produced.

Employees now have a new feeling of responsibility. Steel hammers are no longer used for adjustments. Maintenance costs have dropped, say Timken officials.

A second result: The employee has more pride in his job. Comments such as, "I work on a $38,000 lathe," are frequent.

Date of installation also is shown on the plastic tag.

A line that includes similar machines installed at different times offers a dramatic example of inflation.

Alcoa Broadens Research

A fundamental research facility to serve the rapidly growing foil and packaging industries has been established at New Kensington, Pa., by Aluminum Co. of America, Pittsburgh. Representing a consolidation and major expansion of the company's research operations in these fields, the new facility will be known as the Foil & Packaging Div. of Alcoa Research Laboratories.

Diecasters Predict

Aluminum part output to hit records in '57, '58, American Die Casting Institute says

A RECORD 192,500 tons of aluminum discastings will be consumed in 1957, predicts the American Die Casting Institute. That's 4.9 per cent more than the 1956 record.

ADCI, at its annual meeting in Chicago last week, also stated that zinc diecastings should equal the 1956 mark of 362,500 tons. Wider use on 1958 automobiles, plus an increase in sales to appliance and business machinemakers, is expected to push 1958 sales over the 1957 mark.

Research—ADCI's Die Casting Research Foundation "shows major progress" in its attempt to economically diecast brass and other high melting point metals.

Representatives of most of ADCI's 122 member companies heard discussions on improved lubricants and lubricators, new temperature control systems, more durable cores, and possible new die materials.

Education — The institute is starting a program at Penn State University to acquaint engineering students with diecasting production and applications. The program includes the contribution of a diecasting machine, two annual scholarships, visual aids, reference books, an on-campus exhibit, field trips, and summer employment in diecasting plants.

Officers—Clifford J. Sheehan, eastern sales manager, Die Casting Div., Aluminum Co. of America, was re-elected president, Clifford L. Anthony, works manager, Hoover Co., North Canton, Ohio, was re-elected vice president. David Laine and W. J. Parker, ADCI, were renamed secretary and treasurer. James N. Smith, chief engineer of diecasting plants, Alcoa, received the annual Doehler Award, the highest honor in diecasting.

Exhibits—ADCI regional groups are planning clinic-exhibits to be shown to diecasting buyers during 1958. They will include diecasting displays, finished product assemblies, and special design clinics.

GE titanium-tipped anodizing racks, an example of . . .

New Markets for Titanium

"WHEN 95 per cent of your sales go to one customer, and he jerks his purse strings tighter, you look for new buyers," explains a titanium producer who is accelerating his search for more civilian uses.

Pressure for jet plane and guided missile requirements boosted titanium mill product output from 1900 tons in 1955 to 5300 tons in 1956. Producers were poised for a leap to a predicted 11,000 tons in 1957 when the government cut its aircraft budget and the Air Force stretched out production plans.

Lower Goal—A spokesman for Republic Steel Corp., Cleveland, says: "We believe total mill shipments for this year will be about 7500 tons. Reason for the slowdown is the government's cutbacks in the military aircraft program. The same amount of titanium is still going into each aircraft engine and airframe, but the number of these units being built is reduced. Demand for titanium definitely has not been cut because of any inadequacies in the metal or any scarcity."

Slower military purchasing puts the spotlight squarely on civilian uses. Says Republic: "Approximately 5 per cent of our production goes into civilian applications." Other producers agree that the civilian portion of the market is 5 per cent or less and will have to be improved.

Hurdles — Two major barriers stand in the way of civilian acceptance—lack of information on possible uses and the premium price. Suppliers think they can jump the second hurdle as soon as they cross the first. "We are looking for and finding applications where a less expensive metal can't do the same job properly," says a sales manager for Mallory-Sharon Titanium Corp., Niles, Ohio.

One such application is underwater. Mallory-Sharon announces: "The largest marine use to date—over 300 lb of pure titanium and alloy parts—will be used in a new 60-ft yacht." The firm expects the boat to prepare the way for many new marine and industrial applications where salt water corrosion is a problem. "Finished weight of titanium parts in the yacht is 312 lb, a weight saving of 43 per cent over metals commonly used," company officials add.

Plenty of Possibilities—As the accompanying table shows, many uses are here already; more are on the way. A spokesman for Rem-Cru Titanium Inc., Midland, Pa., says: "The outlook for commercial applications is steadily brighter. Titanium has proved its industrial worth as a lightweight, corrosion-resistant metal which often costs less than other premium metals because of its longer service life."

In a leading metallurgical application, the material proves its worth on the basis of long service. Titanium Metals Corp. of America, New York, reports that anodizing and electroplating-rack fabricators are selling thousands of titanium-tipped racks. "Titanium price declines allow fabricators to use the metal while holding prices to within 30 per cent of racks using common structural metals," say company officials.

TMCA announces that a General Electric Co. plant uses titanium-tipped racks in anodizing aluminum refrigerator parts. Racks formerly had a service life of only

Titanium Finds Civilian Uses

(Based on information from all mill product suppliers except Firth-Sterling, which is primarily a military supplier.)

INDUSTRY	USES	PLANNED OR POTENTIAL USES
Metal finishing	Electroplating, anodizing racks.	.....
Chemical	Valve trim, pumps, thermowells, heat exchangers, impeller covers, impeller wheels, piping systems, hairpin coils, special types of heater tubes & filter press parts, steam jet ejectors, fasteners.	Valves, tower packing (possibly made of expanded metal).
Food processing	Kettles, storage tanks for tomato, bean sauce.	Catsup strainers, strainer screens for pulping foods.
Pulp & paper	Chlorine dioxide mixer lined with titanium sheets. Some special nozzles & other fittings. Chlorine dioxide feed lines.	Backing wire, wire cloth, division strips on vacuum washers.
Pharmaceutical	Heat exchangers, vessels lined with titanium.	.....
Steam power generation	Turbine blades & other turbine parts, feed water trays.	.....
Electronics	Microminiature tubes, some special uses for foil.	.....
Petroleum	.....	Oil well pumps, seawater distillation units for offshore drilling, valves, pressure vessels.
Marine	Masthead tang assemblies for sailboats, hardware, propeller shafts, cutlass bearings, anchor davits, anchors, rail stanchions, heat exchangers, roof stanchions.	Tank linings for chemical tankers, silencers, heat exchangers, pumps, valves, piping, salt water steam condensers, wire in sailboat rigging.
Automotive	.....	Trim & truck frames, tappets, valves, rocker arms.
Civilian aircraft	Engine parts, jet engine nacelles & pods, airframe structural parts, fasteners.	.....
Ore beneficiation	Impellers, autoclaves, tubing, piping, welding fittings.	.....
Medical	Surgical nails and screws, prosthesis, metal implants.	Crutches & braces.
Photography	Containers handling commercial developing solutions. Shutters for high speed cameras.	.....
Textile	Shuttles, spinnerets.	.....
Railroad	.....	Passenger trains.
Atomic energy	Heat exchangers, reactors, pipe, & tubing.	Valves.

a week to ten days; titanium tips stretched it to over three months. Some racks last eight months without repairs, a company official adds. Success in this application creates a demand for an all-titanium rack.

Uses Multiply — Harvey Aluminum, a division of Harvey Machine Co. Inc., Torrance, Calif., adds more civilian uses, ranging from electronic receiving tubes to equipment for preserving fruit juices. In chemical processing equipment, the firm points out that titanium will resist corrosion from chlorides and hyperchlorides. It will prevent pitting in caldrons containing DDT.

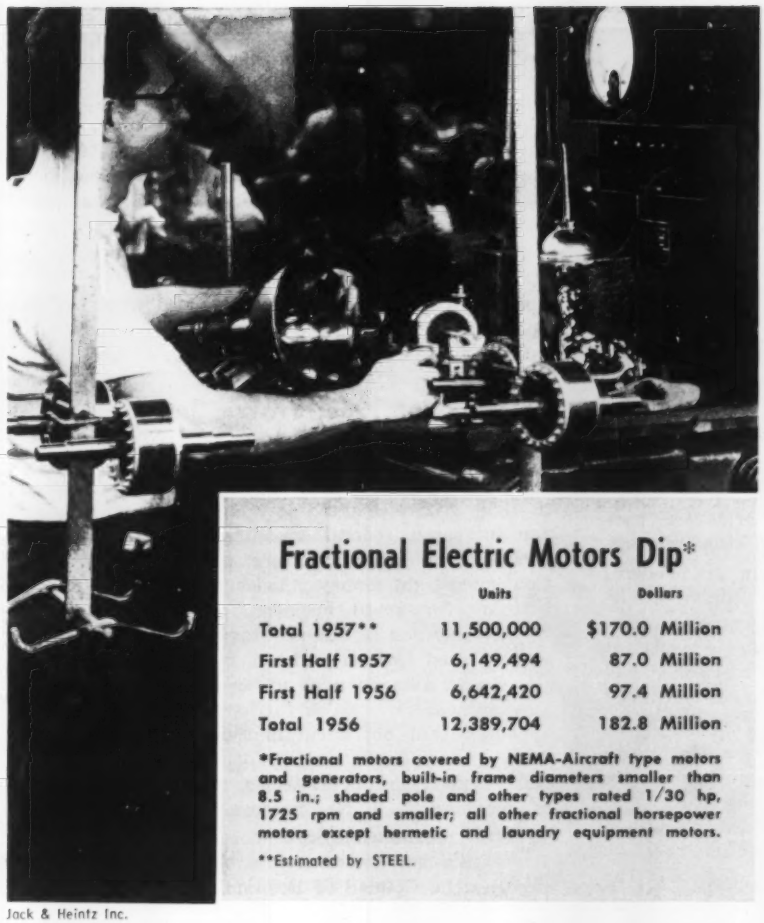
Aiding in the development of new uses is a steadily growing number of firms skilled in fabrication. A Mallory-Sharon spokesman says that more than 100 firms can fabricate mill products. The firm points out that it's not necessary for a plant to make a major change to work with titanium, if the fabricator has experience with stainless steel or other metals. Addition of equipment is not necessary, except for extra fixtures needed in welding.

Growth—Despite the current reductions in demand, several producers are continuing with expansion projects, expecting advances in military requirements for guided missiles and rising civilian demand to make up for declines in military aircraft requirements.

Allied-Kennecott Titanium Corp., New York, has selected a Wilmington, N. C., site for its plant to make forgings and billets. Production will begin late in 1958 or early in 1959. Company officials say the metal's high strength-to-weight ratio at temperatures up to 800° F make it important for commercial aircraft producers. "In aircraft of the future, 75 per cent of airframe weight may be fabricated from titanium," the firm reports.

Harnischfeger Will Build

Harnischfeger Corp., West Milwaukee, Wis., plans to break ground early next spring for a 300,000 sq-ft plant in Dubuque, Iowa. It will make hoists, control equipment, motors, and other electric products.



Jack & Heintz Inc.

Fractional Electric Motors Dip*

	Units	Dollars
Total 1957**	11,500,000	$170.0 Million
First Half 1957	6,149,494	87.0 Million
First Half 1956	6,642,420	97.4 Million
Total 1956	12,389,704	182.8 Million

*Fractional motors covered by NEMA-Aircraft type motors and generators, built-in frame diameters smaller than 8.5 in.; shaded pole and other types rated 1/30 hp, 1725 rpm and smaller; all other fractional horsepower motors except hermetic and laundry equipment motors.

**Estimated by STEEL.

Fractionals Slow Down

Decreased sales reflect lag in appliance industry; 1957 expected to be 5 to 10 per cent below 1956. Price hike believed likely despite keen competition

SALES of fractional horsepower electric motors are running slightly behind last year's (see table). The industry estimates 1957 will be 5 to 10 per cent under 1956 and expects the current sales level to continue well into 1958.

Big Reason—The appliance industry, one of the largest users of fractional horsepower motors, produced 10 to 15 per cent fewer units the first half of 1957 than it did the first half of 1956 (STEEL, Sept. 9, p. 63).

"There's just too much fractional motor capacity for the demand," says an executive of a midwest producer. "And competition has become terrific."

Despite competition, which is a definite brake on prices, an increase may come in the next six months.

"A relatively small price increase on many lines of fractional motors seems likely to be necessary in the near future to offset material and labor cost increases during 1957," says a spokesman for General Electric Co.'s Fractional Horsepower Motor Div., Ft. Wayne, Ind. About 5 per cent is the prediction of James D. Calkins, application engineer, Commercial Motors Dept., Jack & Heintz Inc., Cleveland.

Spiral — "Increased labor and material costs upped prices 5 per cent two years ago and another 7.5 per cent last year," he recalls.

In addition to the appliance industry, producers of pumps, furnace fans, and air conditioners use fractional horsepower motors. The most widely used include alternating and direct current motors, ¼ and ½ hp, 1800 through 3600 rpm; alternating current 1/3 and ¾ hp up to 1725 rpm. Direct current motors are frequently used for variable speeds.

The change to smaller frames has customer acceptance. They like the gain in horsepower as well as the smaller size.

Something New—GE has announced a new line of Form G severe-duty motors (single phase 60 cycle and three phase, 60/50 cycle). Horsepower ratings are 1/6 through ¾ at speeds of 3450, 1725, and 1140 rpm. The line is designed for abnormal operating conditions such as the powering of dairy and food-processing equipment. (The motors are hosed down regularly.) Other applications are in the plating and mining industries.

The motors have totally enclosed, nonventilated construction, stainless steel shafts, and a corrosion resistant finish.

Westinghouse Electric Corp., Sunnyvale, Calif., is producing a motor designed to shake violently. These "rock 'n' roll" units are manufactured for Southwestern Engineering Co., Los Angeles, makers of vibrating screen separators.

Eccentric weights are attached to the shafts to get the shaking, tumbling motion. The motors are made in ¼ and 1 hp.

Anaconda To Replace Mill

Anaconda Wire & Cable Co. broke ground in Orange, Calif., for a 622,000 sq-ft building project which will extend over three years.

Included are a 572,000 sq-ft production facility, a 15,000 sq-ft administration building, and a 35,000 sq-ft boilerhouse. The plant will replace the present west coast mill.

Ike Seeks New Approach to Inflation

A DISCREET announcement by President Eisenhower's new treasury secretary, Robert Anerson, has set off a new chain of events in the administration's fight against inflation. On the surface, Mr. Anderson's statement merely discloses that the heads of several government agencies will discuss ways to stop inflation.

Mr. Anderson, William McC. Martin Jr., Federal Reserve Board head, Dr. Raymond Saulnier, chairman of the President's Council of Economic Advisers, Dr. Gabriel Hauge, special White House assistant to the President on economic affairs, "and sometimes others," will gather behind closed doors to brief the President.

"These meetings," notes Mr. Anderson, "will provide full discussion and interchange of views in connection with whatever is occurring at the time.

"Interchange of views" is the loaded phrase in Mr. Anderson's report because there has been no straight line of policy established on inflation. The administration has at various times (and at the same time), followed these different tactics which directly affect metalworking:

1. Hold down consumer spending (the President's recent advice to the public). 2. Hold down capital spending (FRB's tight money policy). 3. Hold down Defense Department spending (annual $38 billion ceiling). 4. Maintain or increase foreign aid (proposed fiscal 1958 budget). 5. Increase tariffs on goods and raw materials competing with U. S. industries (lead-zinc proposals by Interior Department). 6. Increase social security benefits (part of the administration's long range program). 7. Increase minimum wages (a Labor Department program). 8. Encourage self-sufficiency in our supplies of critical materials (fast tax writeoffs and buying contracts for metals). 9. Maintain corporate taxes. 10. Cut personal taxes.

New Look Will Be Unanimous

Now the President, encouraged by Mr. Anderson discussions among government agencies were originally suggested by him), hopes to get his advisers to agree among themselves, so he may present a concise and workable policy to the public in his January, 1958, State of the Union message.

White House observers believe Ike will get unanimity, even if some heads have to roll. The weakest spot in the administration's armor may be the Council of Economic Advisers, where there remains a good deal of sentiment for New Deal ideas, which, up to this time, has been carefully presented as New Republicanism.

But the chips are down with the Democratic victory in Wisconsin, so look for the administration to play down some of its more "advanced" social philosophy and play up its more "sound" conservatism.

Outlook for 1958: Status Quo

Don't be surprised in January if you hear the President advocate: 1. No tax cuts to be effective in 1958. 2. A $70-billion budget with no provision for increased federal spending for schools, social security, or other "welfare state" concepts. 3. Continued tight money policies. 4. A do-it-yourself attitude for small business. 5. A conservative recommendation to increase tariffs where U. S. firms are affected (which will not be pushed too hard if the House gets its back up as it did with the lead-zinc proposals). 6. A further reduction in defense spending (but not a cut in the missile phase). 7. No help to industry in the form of revised depreciation regulations, tax writeoffs, or government buying of surpluses. 8. No increase in foreign aid.

Those recommendations will follow directly from the FRB's new influence on the President's thinking and the Council of Economic Advisers' declining influence.

McElroy To Get Full AF Treatment

Defense Secretary Neil McElroy is off on his first official sightseeing tour of the nation's defense setup. His itinerary: Strategic Air Command, Omaha, Nebr.; Continental Air Defense Command, Colorado Springs, Colo.; Boeing Airplane Co., Seattle; Ramo-Wooldridge Corp., North American Aviation Inc., Lockheed Aircraft Corp., and Douglas Aircraft Co. Inc., all in Los Angeles; Convair Div., General Dynamics Corp., San Diego, Calif., and several atomic installations. Only non-Air Force visit, besides the atomic tours: The Army's Redstone Arsenal, Huntsville, Ala.

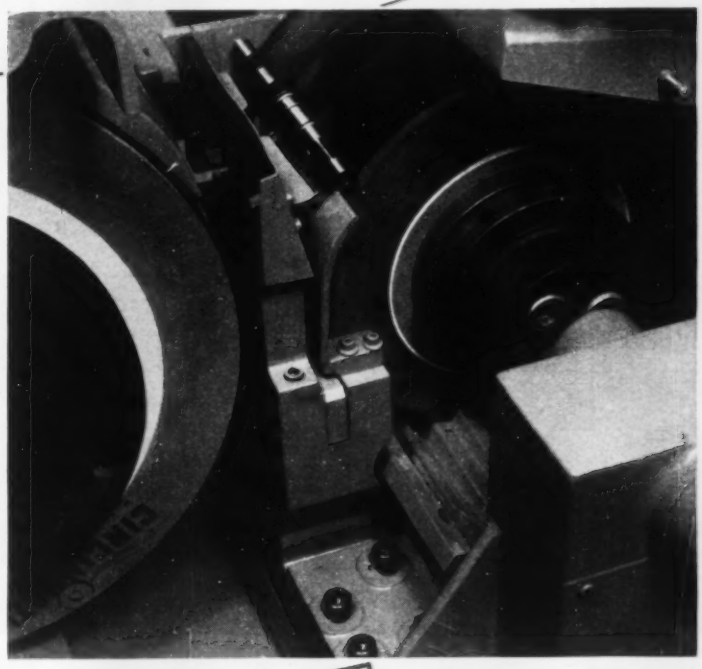
First Six Months' Report from SBA

Small Business Administration approved 1936 loans for $89 million in the first six months of 1957, compared with 1600 loans for $70 million in the last half of 1956. Since 1953, the average loan has amounted to $45,770. Government setasides for small firms increased 31 per cent in dollar value during the first half of the year to $399 million.

Cincinnati Filmatic Nos. 0·2·3·4·5·6 Centerless

The No. 2 is the machine for this job . . . grinding four diameters of household refrigerator crankshafts

FILMATIC®



Multiple diameter jobs are "naturals" for CINCINNATI® FILMATIC Centerless Grinders . . . and for Cincinnati's 32 years' experience in centerless tooling. The illustration at the right shows how these two major elements of production—the right machine and the proper tooling—have been combined to reduce the cost of grinding four diameters on crankshafts for a well-known refrigerator. ¶ A new CINCINNATI FILMATIC No. 2 was selected for the job. All four diameters are centerless ground simultaneously; to close limits of accuracy; exactly in line with each other.

The operator merely pushes a button, and the entire grinding cycle proceeds automatically.

Much of the outstanding success of centerless grinding this part can be attributed to the machine. FILMATIC grinding wheel spindle bearings cannot deflect under wide infeed cuts; bed-rock design for grinding wheel spindle housing withstands maximum hp metal removal; swivel mounting of regulating wheel pile simplifies setups; anti-friction infeed slide reduces maintenance and helps to maintain close tolerances. Would you like to know more about the latest CINCINNATI FILMATIC No. 2 Centerless? Or perhaps the entire line? Look in Sweet's Machine Tool File.

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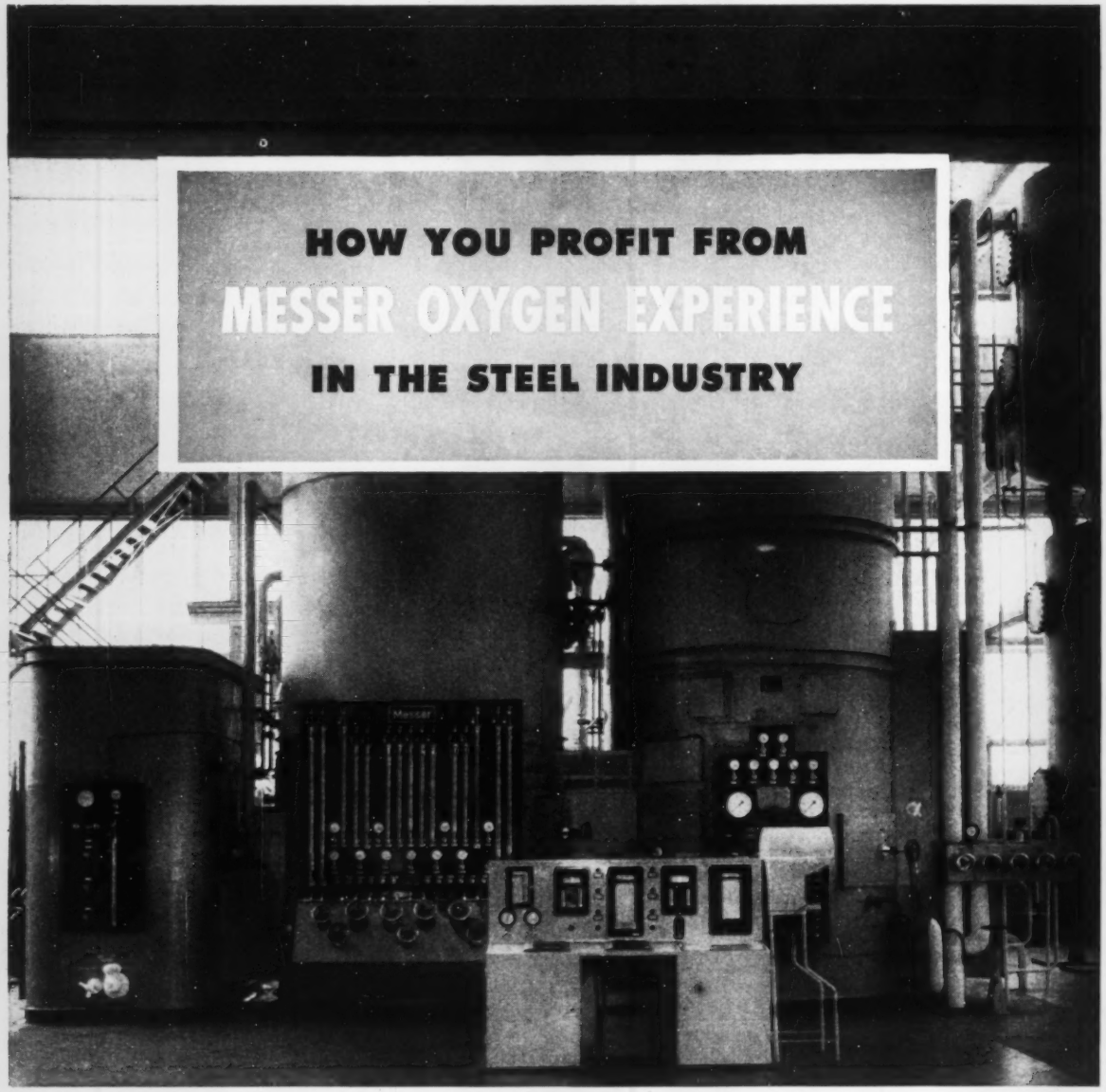

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In the steel industry, continuous operation is the key to efficient production. Messer's long and broad experience in the engineering of oxygen plants means dependable, month after month, production—and MONEY SAVED.

For example, here is a report from Cockrill-Ougre (Luxembourg) on Messer dependability:

(from a letter dated November 19, 1956)

". . . We are confirming that the installation of a plant of 80 tons per day capacity, which you furnished, has been functioning at our facilities since February of 1954. After small adjustments during start-up, two periods of uninterrupted service of 12 and one-half months were obtained.

Gentlemen, we are most happy to express our distinct satisfaction."

In the United States and abroad, more than 1500 Messer Oxygen plants are performing efficiently and dependably. May we give you more information?

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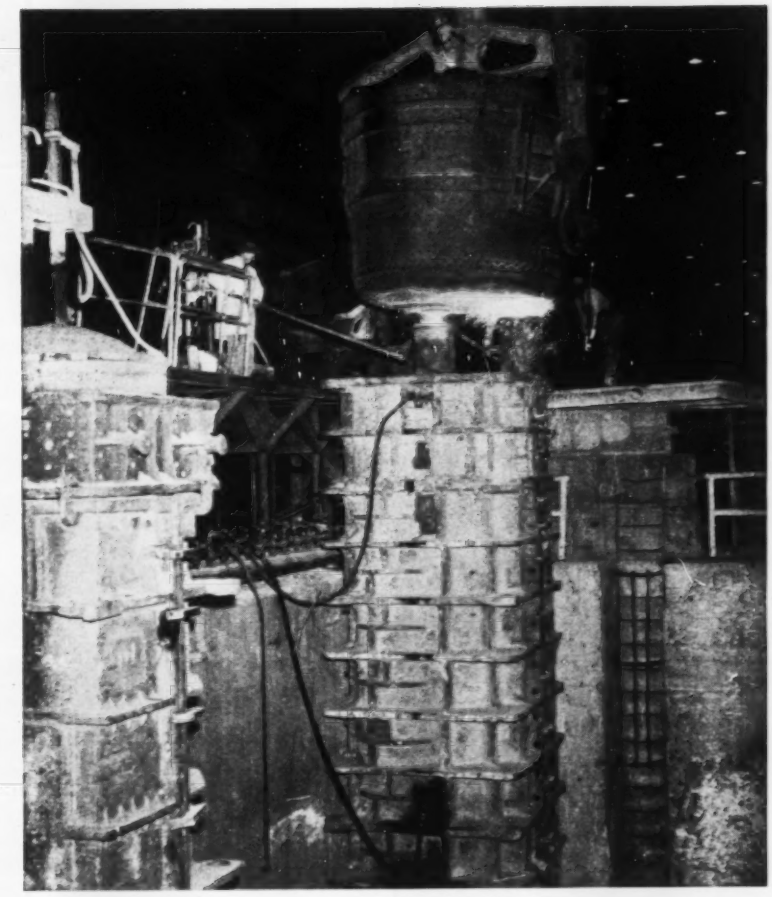


Pouring a roll at Ohio Steel Foundry Co., Lima, Ohio

Rollmaker Forges Ahead

"I'M a great believer in luck," says John E. Galvin. "The harder I work, the more of it I seem to have."

After 50 years at the helm of the business he helped found, Mr. Galvin is still working to chart the course for Ohio Steel Foundry Co., Lima, Ohio. As chairman and owner, he has the final word in all decisions affecting his firm, one of the nation's largest producers of steel rolls.

By Oct. 1, metalworking will see concrete evidence of his latest decision: Footers for a $3.5-million forge plant which may increase Ohio Steel's business by 20 per cent.

Expansion—Since 1950, Mr. Galvin has spent $7.4 million for plant additions at Lima and Springfield, Ohio. Unhampered by dividend requirements, he has been able to finance expansion out of earnings. At Lima, his company makes cast steel, cast iron, and forged rolls; at Springfield, steel castings, high alloy corrosion castings, and oil refinery fittings.

Although it has never forsaken the castings business on which it was established, Ohio Steel has taken many a tack in its search for a favorable wind. Founded at Lima in 1907, it poured its first heats as a supplier to the Lima Locomotive Works, its next door neighbor. In 1913, it began to produce hydraulic castings and in 1917 purchased a Springfield foundry which Mr. Galvin had organized as a personal venture. During World War I, the company made castings for the carriage of a 155-mm gun.

Diversification—With the advent of diesel locomotives and the decline of steam power on railroads, Ohio Steel developed a gasoline power shovel which would require large tonnages of castings. As a step toward market diversification, it also began production of cast steel side frames and bolsters for freight car trucks.

In 1928, the company sold its shovel to Lima Locomotive Works (now Baldwin - Lima - Hamilton Corp.), projecting that firm into the construction equipment business, where it has need for many Ohio Steel castings. In 1928, too, Mr. Galvin's firm began production of oil refinery fittings as a supplier of return bends to Latonia Refining Co., Latonia, Ky. The early thirties brought significant developments at Lima, where first steel rolls and then iron rolls were cast. In 1942, the company answered an army ordnance call for additional breech ring capacity. After proving that rings could be cast as well as forged, Ohio Steel began operation of a new ordnance foundry. By the end of the war, it was producing more than 90 per cent of the rings used on American artillery.

Emphasis on Rolls — Quitting the breech ring business in 1945, the company acquired the ordnance foundry and outfitted it for cast roll production. In 1953, it gave up manufacture of side frames and bolsters for railroad car trucks because of the trade's boom and bust nature.

To strengthen its marketing position, the company in 1954 moved into production of forged work rolls. While it relies on other firms to forge its rolls, Ohio Steel controls their metallurgy and does the machining, heat treating, induction hardening, and testing. Completion of its own forge plant and installation of a vacuum pouring unit, scheduled for the last half of 1958, are the final steps in the company's forged roll expansion program.

Appraisals Should

Human Relations . . .

1. How tactful is he with others?
2. How well does he control his emotions?
3. How well does he co-operate with associates?
4. Do his associates and subordinates find him easy to talk to?
5. Does he treat his employees fairly?

Management Ability . . .

1. Does he get and evaluate facts when considering a problem?
2. Does he speak and act for the good of the company?
3. Does he follow through on plans and commitments?
4. Does he delegate responsibility?
5. Does he accept additional responsibility?

Leadership . . .

1. Does he develop subordinates?
2. Does he accept constructive criticism and take corrective action?

Appraisal counseling can help you learn . . .

How To Be a Better Boss

HOW AM I doing? Is the company interested in my progress? How can I improve?

Such questions concern every individual in your first-line supervisory, junior, and middle management levels. Constructive answers should be supplied.

An effective appraisal counseling program will do the job for you. Its communications factor is important, but its other functions are equally valuable:

1. It's a tool to help improve the effectiveness of each individual in his present position.

2. It focuses attention on ways to prepare individuals for greater responsibilities.

3. It'll help insure availability of qualified men to fill vacancies or newly created posts.

4. It'll help the individual to develop his potential.

What Is It?—Appraisal counseling is a periodic review of an individual's performance by his superiors. Superiors, as a panel or team, discuss the individual and his progress within the company—stressing his strengths and weaknesses. The individual and his immediate superior (and sometimes others) talk over the review in private. They determine action the individual and/or the company can take to improve his work.

The panel of appraisers should include the individual's immediate superior and three or four others who work directly with or have knowledge of the individual involved. Leeds & Northrup Co. recommends a team of four—the immediate superior, at least one or two members of a higher management level than the individual, and one or two of his peers.

L&N gives the individual the option of selecting one of his appraisers. "This increases his confidence in getting a fair appraisal and strengthens his co-operation in carrying out whatever development action may be suggested," says Edward R. Fiske Jr., in charge of personnel development.

Appraisals can be handled like an informal conference—one man, generally the immediate superior, is chairman and one member is recording secretary.

Most industrial relations executives feel that appraisals should be held once a year.

Guideposts for Success—A successful appraisal session depends upon: 1. Providing the appraisers with a set of factors to be covered so that the discussion is channeled. 2. Maintaining the appropriate atmosphere—the objective is to help the individual to improve. 3. Seeking facts—not gossip—and backing them up with reports, records, and illustrated comments. 4. Requiring all final statements in the appraisal to be the unanimous opinion of the appraisers.

Both Leeds & Northrup and Burroughs Corp. use a detailed guide to conduct the appraisal—(see exhibit). Both reduce the

Cover These Factors

3. Does he act on his own responsibility?
4. Does he express himself well?
5. Does he maintain discipline?

Administrative Ability . . .

1. Does he promote and sell his ideas?
2. Are his decisions and commitments completed on time?
3. Does he prepare for changes and formulate new ideas?
4. Does he control and use his budget?
5. Does he keep subordinates informed of policies, practices, rules, and job responsibilities?

Technical Performance . . .

1. Is his knowledge of company policies adequate?
2. Does he know his job?
3. Does he know the jobs that affect his?
4. Does he keep up with developments in his field?
5. Does he promote work simplification?

Source: Burroughs Corp.

appraisal itself to specific statements about the individual's strengths and weaknesses. L&N summarizes the appraisal under two categories—personal qualifications and performance, including results achieved and methods used. Burroughs uses the five major headings shown in the exhibit.

The Interview — Probably the most important phase is the interview involving the individual and his immediate supervisor. Proper atmosphere is a necessity. The discussion is not a trial; the purpose is to inform the individual of his progress and give him counsel. Two pitfalls: Don't discourage the individual. Don't raise expectations which can't be filled.

The superior should be prepared to offer suggestions. They often include such things as guided reading, attendance at special conferences, night school, visits to other plants, committee assignments, job rotation, and special assignments.

To stimulate followthrough, Burroughs has the counseling superior fill out a form following the interview which covers these points:

1. What are the individual's ambitions within the company?
2. Is he satisfied with his progress?
3. What plans have you made with your subordinate to improve his management competence during the next year?
4. If the employee has indicated that he desires more responsibility, what plans does he have to prepare for it?
5. If you consider the employee suitable for a higher level position, what have you done to help him with his self-improvement plans?

Before submitting a review of appraisals of his subordinates to top management, the superior generally gives the individual one of these over-all ratings:

1. Immediately promotable. 2. Performance completely satisfactory, but employee needs further training before he is promoted. 3. Performance completely satisfactory, but he has no desire for promotion. 4. Performance completely satisfactory, but individual doesn't have capacity for higher promotion. 5. Performance acceptable, but needs improvement to be completely satisfactory. 6. Performance is questionable; employee should be considered for reassignment.

Top management — a review board or panel is recommended—can go over the appraisals to get an idea of how a department is staffed and managed and make specific recommendations for improvement.

An Extra Benefit—Participation is an important part of appraisal counseling. Most individuals appraised also will have the opportunity to appraise others.

Although appraisal counseling can be set up and co-ordinated by a staff function—generally industrial relations—its administration must be line management's responsibility.

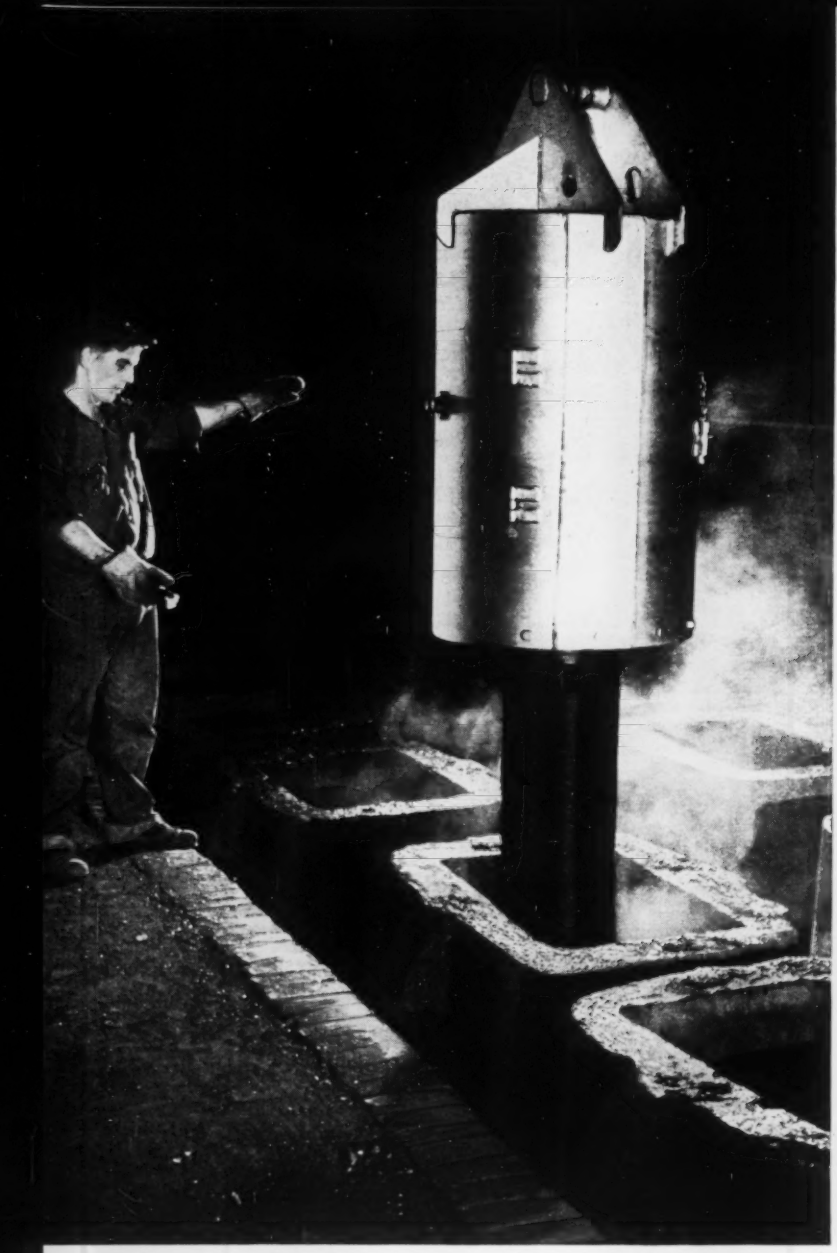
To be successful, appraisal counseling must have the blessings of top management. Suggestion: For a starter, ask the brass to test run appraisal sessions, using top level management as subjects. All concerned will get the feel of it.

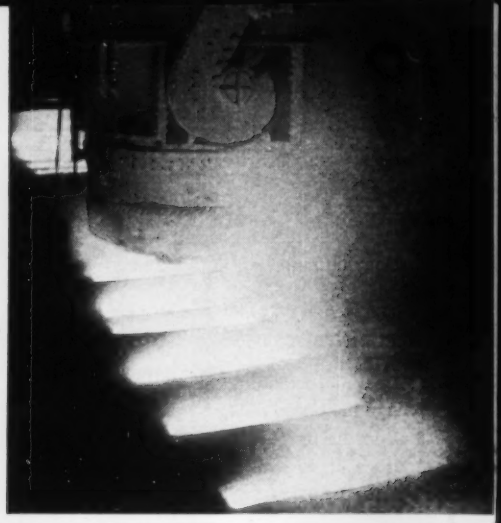
Expect These Results — Once you've sold the program and experience takes hold, intangible benefits become apparent. The appraisal sessions will produce more than just a rating of the individual. When a superior is discussing the work of one of his subordinates, he is often reflecting his own management practices. One company reports experiences like this one:

A supervisor was rating one of his subordinates low in ability to accept responsibility. Two other appraisers challenged him and asked whether he was creating the proper climate for the individual to accept responsibility. The superior admitted that perhaps he hadn't given the individual the opportunity to show his ability.

Appraisal counseling is not a substitute for an effective management development program. As a supplement, it could form the core of your management development activities because of its communications potential.

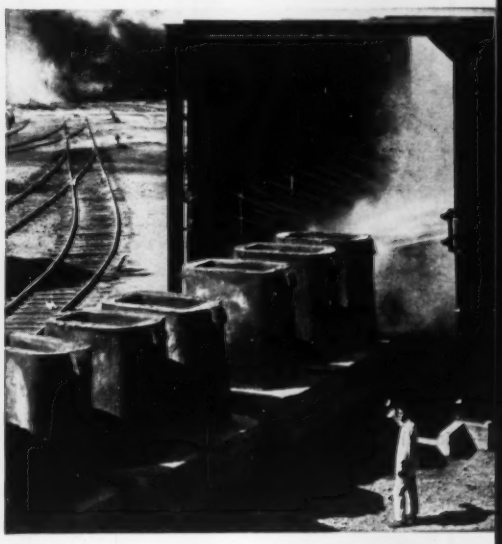
• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*





A giant 250-ton teeming ladle (shown above) fills a train of ingot molds at Great Lakes Steel.

Cooling the empty molds with a water spray (below) gives more uniform cooling rate, assures return of molds at proper temperature.



How Great Lakes Steel *coats ingot molds* for quality

At Great Lakes Steel, ingot molds get a high-temperature resinous coating by means of America's fastest spinner applicator (see picture above). Rotating at 1,700—2,000 rpm, the applicator applies a more even coating to the molds. In just ten minutes, 28 molds are lined with a highly protective shield for the ingot surface. Repeated before each use, this added step in production helps eliminate defects by repelling splashes of molten metal from the mold walls.

This is only one of the hundreds of methods and operations used by Great Lakes right from the start of steel making to maintain the high and uniform quality of its products. This uniform quality can mean real savings to you.

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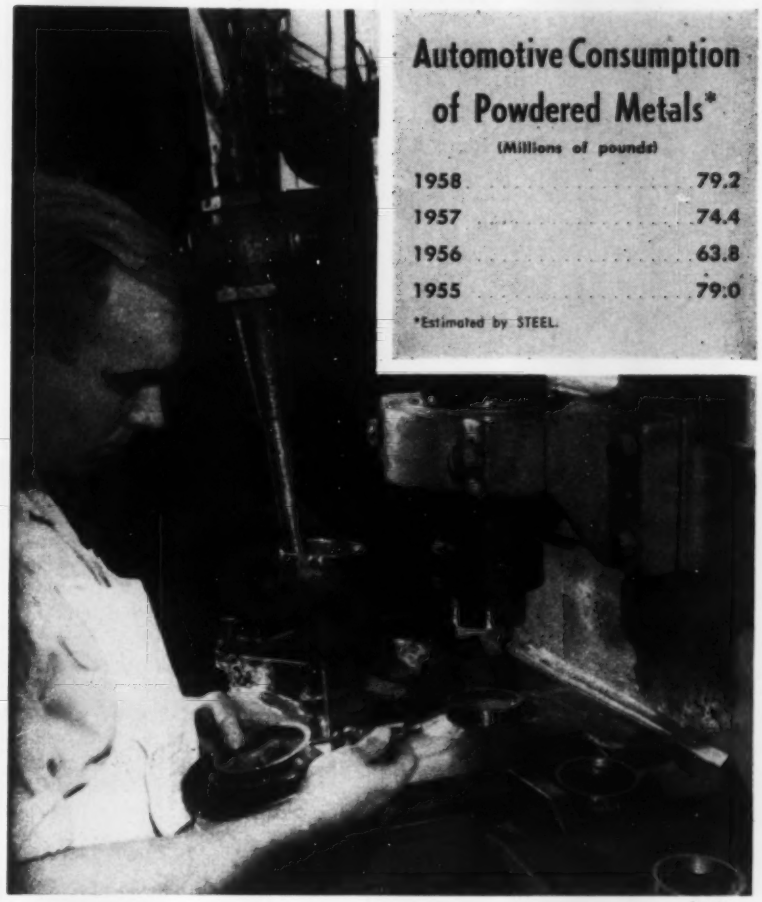

Steelways

Automotive Consumption of Powdered Metals*

(Millions of pounds)

1958	79.2
1957	74.4
1956	63.8
1955	79.0

*Estimated by STEEL.

Powdered Parts Get Bigger

POWDERED METAL consumption is growing at a 3 or 4 per cent annual rate in the auto industry, estimates J. J. Roberts, manager of the powder metal parts division, Allied Products Corp., Detroit.

D. B. Martin, vice president of Chrysler's Amplex Div., point out there are more than 100 applications in '57 and '58 cars. Five years ago, there were between 50 and 75 uses. The average car now contains about 12 lb of powdered metal parts.

Bigger — It's believed that the number of parts won't increase too rapidly in the next few years, but larger and more durable ones will be developed.

Roy Blue, Amplex chief engineer, says the next area of development is apt to be in the use of alloy powders such as nickel chrome. They will give the greater hardness needed in gears, small pistons, and levers which are gaining acceptance in pumps and transmissions.

Parts made from stainless steel powders already are successful. But Mr. Blue indicates that so far there is little automotive demand for powdered aluminum parts.

Future—Mr. Martin thinks brake parts and some types of auto clutches may be made from powdered metals because friction materials can be added easily during manufacture.

Friction clutch plates and parts of some brakes already are being turned out for heavy duty vehicles and certain types of industrial engines.

Past—In 1928, Amplex developed its bronze Oilite (oil impregnated) bearing used for clutch pilot bearings in early transmissions. The bearing it replaced was inaccessible and froze up because it couldn't be lubricated, explains Mr. Martin.

Although all early applications were in bearings, the industry now makes filters, gears, bushings, small valves, and levers.

Long Life — A clutch throw-out bearing made of Oilite withstood 2.5 million declutchings before it failed. The same part made from machined steels conked out after 250,000.

Cheaper — Manufacturing methods are inexpensive.

"This year's cars use ball joint shock absorber pistons which are ten times less expensive than cast pistons and wear ten times longer," explains Mr. Martin.

Competition — Moraine Products Div., Dayton, Ohio., turns out most of GM's requirements.

Ford started making powdered metal parts last year. The industry expects Ford will show the greatest increase in applications in the next few years.

Juggling Act — "We find ourselves competing with stampings, castings, forgings, and extruded parts. A bushing may be made of powdered metal one year and be diecast the next. Cost usually is the deciding factor," says Mr. Blue.

Powedered metal people like to think they can shave prices at least 10 per cent through reduced machining.

The powders are formed in close

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tolerance dies and fused in ovens. Powder metallurgists no longer like the term "sintered."

"We can hold tolerances to 0.002 in. with little difficulty," says Mr. Blue.

Example: An oil pump rotor 2.5 in. in diameter, which weighs 2.5 lb, is held to within 0.003 in. tolerance—and that's big for a powdered part.

Buick Chief Predicts Sales

The auto industry will produce and sell about 6 million cars in 1958, estimates Edward T. Ragsdale, Buick's general manager.

This cautious prediction puts Mr. Ragsdale on the low side of industry seers. George Romney, AMC president, earlier made a sales estimate of 6.2 million. Most semiofficial guesses are plugging for 6.5 million car sales.

Mr. Ragsdale has reason to be cautious. In 1956, Buick sold 530,000 cars to take 10 per cent of the market and Mr. Ragsdale predicted 1957 sales would be even better—possibly around 675,000.

Buick will do well to hit the 450,000 sales mark for '57. It's currently accounting for about 6.5 per cent of industry sales.

Mr. Ragsdale figures Buick will get a greater percentage next year, but he doesn't say how much.

Imports — The Buick chief has passed along some plans concerning the German-built Opel cars Buick will start selling next month.

"We will import 1000 Opels a month starting Oct. 1. After three or four months, we'll evaluate dealer reports to see whether the capacity should be increased," explains Mr. Ragsdale.

He figures 4 per cent of 1958 industry sales will be foreign economy cars. Based on a 6 million car year, this means foreign sales of almost a quarter million. About 135,000 economy imports are expected to be sold this year.

New Models — Although details on '58 Buicks won't be released until Oct. 22, Mr. Ragsdale conforms these rumors:

- The cars will be about 2 in. lower; roof and window parting strips are gone. So are the front fender "portholes."
- The division will introduce a luxury series called the Limited.
- Air suspension is available on all models and standard on top two lines.
- Aluminum finned brakes will be used on all but the Special series. The 15-in. wheels are retained.

Other company sources say Buick has spent $100 million on its 1958 model change.

AMC Denies Crisis Talk

George Romney, American Motors president, denies his firm will have difficulty in extending its loans which fall due Sept. 30, 1958.

Says Mr. Romney: "On the basis of indicated operations, I do not anticipate difficulty in securing a renewal of our banking requirements. I already have discussed such a renewal with the banks."

Earlier reports have suggested AMC owed a lending group of 28 banks some $45 million.

Mr. Romney says this is almost the amount borrowed during 1957 ($40.5 million), but subsequent payments have cut the debt to $29.2 million. That's the lowest it has been since the company was formed.

His comments scotch talk that the firm might be pushed into a merger or undergo a shakeup to rid itself of unprofitable operations if loans weren't extended—the suggestion cropped up when it was revealed financier Louis E. Wolfson had bought a majority of AMC stock.

Mr. Romney denies such talk. He still maintains the company will be in the black in fiscal 1958 which begins next month for AMC.

U.S. Auto Output

Passenger Only	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
July	495,629	448,876
August	524,854	402,575
8 Mo. Total	4,393,371	4,044,052
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Aug. 17	117,589	98,348
Aug. 24	123,130	69,676
Aug. 31	118,563	58,166
Sept. 7.	90,704	47,827
Sept. 14	88,844†	63,798
Sept. 21	45,200*	35,652

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Electric Motors: New Look?

Electric motors used to actuate auto accessories should be designed so they can be slipped under car seats and into doors, says Vaughn H. Hardy, chief engineer of GM's Delco Appliance Div., Rochester, N. Y.

Mr. Hardy, speaking at a meeting of the Society of Automotive Engineers in White Sulphur Springs, W. Va., said: "We feel the motor of the future will no longer be round or even look like a motor."

He adds gearboxes also must be simplified and reduced in cost so electric actuators can compete with hydraulic and air operated units.

If the changes are made, Mr. Hardy feels electricity will be the cheapest way to open car doors and operate fuel pumps, header locks, steering mechanisms, and road speed governors.

Exhaust Notes

- Chevy says it will break ground within a month for its aluminum foundry at Massena, N. Y. The plant will employ 700 and will produce castings for engines and transmissions.
- The average car owner buys a new model at least once every three years, according to findings of the University of Michigan Survey Research Center. Of the families interviewed, 42 per cent buy at least one car every 32 months. Another 14 per cent buy twice, 4 per cent three or more times in that period.
- American Motors has added 421 dealers in the first eight months of this year, 70 of them in August. The firm is expecting the Rambler to spark a comeback in 1958. Its imported Metropolitan has sold 78.5 per cent more units than it did in 1956.

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A typical job at Westlof Tool & Die Co. — die tryout on progressive tooling. The press is also used for die tryout on Transmat type tooling.

Catalog G-57 presents basic data on all types of Verson presses. Write for your copy.

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The press itself incorporates several features which are examples of the versatility Verson engineering can provide: The ram is equipped with three triple bank cushions adjustable right or left to 7″ centers. The bed has two large cushions, one right, one left. All cushions are independently controlled. The press is equipped for application of coil feeding equipment should it become necessary. Press speed is variable from 15 to 30 strokes per minute. Power adjustment of the slide is 15″.

If your requirements call for great versatility, bring your problem to Verson. For specific recommendations, just send an outline of your needs.

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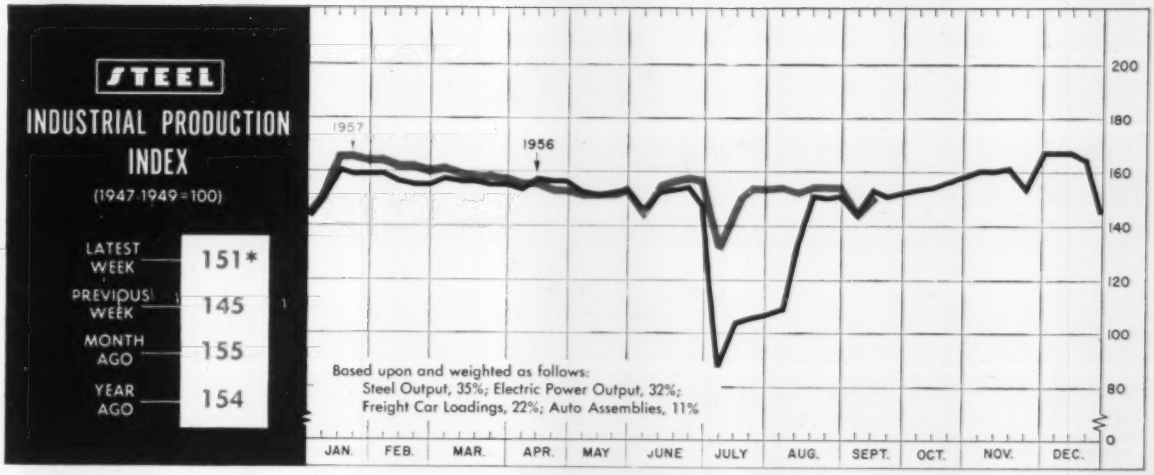


*Week ended Sept. 14.

Industry Is Setting Records in 1957

THIS YEAR may not be everything that everybody expected of it, but in many respects it will go into the record books as the best in our history. It has been characterized as a year of "rolling adjustment" or "high level production." The net result may not be as spectacular as in the last two years, but it sets a new standard to shoot at in 1958.

Production — STEEL's industrial production index (above) has been above the year-ago level with only a few exceptions. During the fourth quarter, it will just about equal 1956's corresponding period, which will result in a weekly average of about 156 for this year, compared with 150 last year. The Federal Reserve Board's production index also will set a record monthly average this year. While it may fall short of the record 147 (1947-49=100) set last December, it will still be strong enough to rack up a monthly average of 146 for the year, compared with last year's 143.

GNP — Gross national product will set records for both dollar and physical volume this year. The first half witnessed an annual rate of about $432 billion, and the addition of a $435 billion third quarter and a $437 billion fourth quarter will put the yearend total between $434 billion and $435 billion. That is an increase of 4.3 per cent over $414.7 billion in 1956.

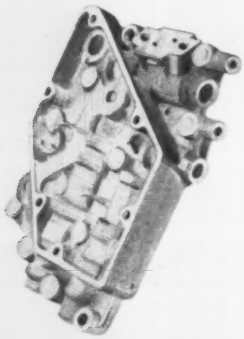
Prices—Wholesale prices, stimulated by the pass-on of material price hikes and wage increases, will advance steadily to a new high of 120 (1947-49=100) by the end of the year. Consumer prices will take a similar course and end up at about 122 (1947-49=100) by next Jan. 1. Bigger price tags on new autos and appliances will contribute heavily to this.

Durable Goods — Despite some weakening in new orders, durable goods will wind up this year with an advantage over last year. Monthly shipments have been con-

BAROMETERS OF BUSINESS

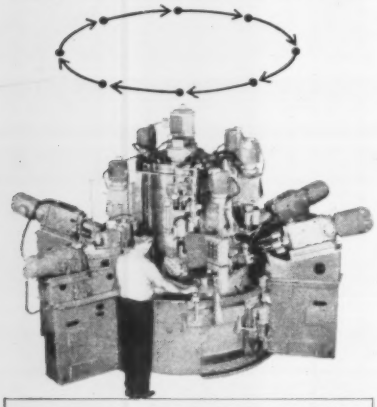
	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,076[1]	2,097	2,477
Electric Power Distributed (million kw-hr)	12,100[1]	11,678	11,339
Bituminous Coal Output (1000 tons)	8,845[1]	9,990	8,730
Petroleum Production (daily avg—1000 bbl)	6,750[1]	6,807	7,049
Construction Volume (*ENR*—millions)	$262.0	$314.1	$372.5
Auto, Truck Output, U. S., Canada (*Ward's*)	109,134[1]	110,839	86,186
TRADE			
Freight Car Loadings (1000 cars)	745[1]	648	821
Business Failures (Dun & Bradstreet)	208	262	196
Currency in Circulation (millions)[3]	$31,256	$31,145	$30,910
Dept. Store Sales (changes from year ago)[3]	+2%	+5%	+4%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,417	$18,191	$19,287
Federal Gross Debt (billions)	$273.5	$273.8	$275.4
Bond Volume, NYSE (millions)	$17.0	$12.6	$21.5
Stocks Sales, NYSE (thousands of shares)	9,051	5,479	9,835
Loans and Investments (billions)[4]	$86.3	$86.5	$85.7
U. S. Govt. Obligations Held (billions)[4]	$24.8	$24.9	$26.5
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.71
STEEL's Nonferrous Metal Price Index[6]	209.6	209.3	266.1
All Commodities[7]	118.1	118.3	115.1
Commodities Other Than Farm & Foods[7]	125.8	125.9	122.6

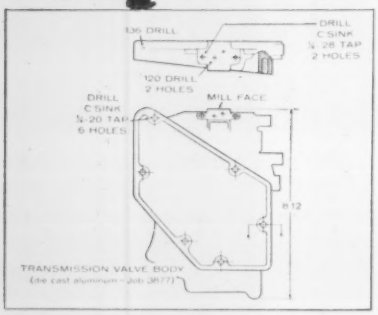
*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.



- drills
- c'sinks
- taps
- mills

460 PER HOUR GROSS





Milling is at high speed—7200 rpm. Five vertical units on the center column operate on the holes in the milled face. Three angular units operate on the six mounting holes. The machine has a 60-inch index table with eight stations.

A Kingsbury indexing automatic is the best way to perform drilling types of operations—

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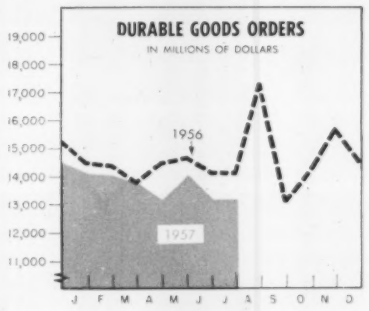
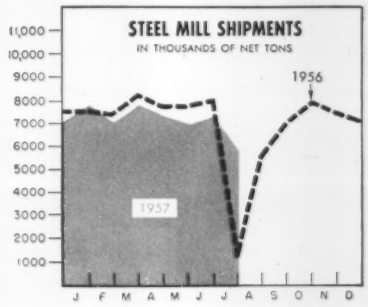
THE BUSINESS TREND



	New Orders*		Sales*	
	1957	1956	1957	1956
Jan.	14,176	14,449	14,941	13,832
Feb.	14,102	14,374	14,808	13,824
Mar.	13,853	13,771	14,198	13,252
Apr.	13,234	14,468	14,254	13,723
May	14,115	14,654	14,296	13,570
June	13,249	14,093	14,207	13,587
July	13,069†	14,087	14,642†	13,021
Aug.	.....	17,342	.....	13,723
Sept.	.....	13,042	.....	13,449
Oct.	.....	14,312	.....	14,393
Nov.	.....	15,776	.....	14,249
Dec.	.....	14,543	.....	14,526

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.



	Net Tons		
	1957	1956	1955
Jan.	7,809,451	7,587,870	6,009,958
Feb.	7,066,732	7,468,393	6,119,900
Mar.	7,821,616	8,255,824	7,268,795
Apr.	7,349,752	7,783,873	7,279,321
May	6,972,091	7,764,776	7,540,889
June	7,284,616	8,077,805	7,770,213
July	5,877,133	1,288,988	6,250,597
Aug.	.....	5,539,915	7,053,615
Sept.	.....	7,058,028	7,378,247
Oct.	.....	7,930,957	7,216,821
Nov.	.....	7,431,136	7,247,994
Dec.	.....	7,064,093	7,580,943

American Iron & Steel Institute.

Charts copyright, 1957, STEEL.

sistently above the year-ago marks, even when price boosts are taken into account (see table, above). This situation will persist, even though orders continue to slip under shipments, because of the huge backlogs for durable goods. On Aug. 1, unfilled orders were $56.3 billion, good enough for about four months' business at current rates.

Capital outlays for plant and equipment are peaking out this quarter, says the Commerce Department, and will level off during the remainder of the year. The total for the year will end up between $37 billion and $37.4 billion, well ahead of last year's record $35.08 billion.

Other durable goods forecasts for 1957: Machine tool shipments, $900 million; railroad car shipments, 99,000 plus; agricultural machinery sales, 10 to 15 per cent over 1956's; appliances production, 10 to 15 per cent under 1956's (see STEEL, Sept. 9, pp. 63-65); metalworking sales, $138 billion.

Construction—Construction again will be one of the chief supports of the national economy, totaling $46.8 billion, compared with last year's $46.1 billion. While dollar volume will be up, physical volume will be down. The highway program did not materialize according to earlier predictions, and residential construction is significantly below year-ago levels. The year-to-year decrease in contract awards will not greatly affect construction put in place until sometime in 1958.

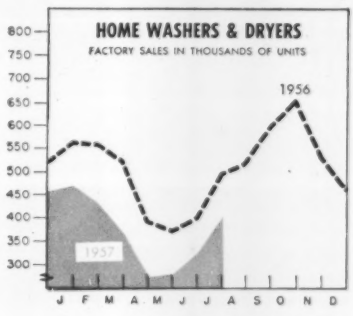
Business Community — Business failures this year will probably set a record of around 13,400. At the same time, new incorporations will slip from 140,775 last year to around 134,000 this year. But the business community will continue to grow, making a net addition in 1957 of about 50,000 firms. Total by Jan. 1: 4,350,000 active business firms.

Automobiles — For the third straight year, early estimates of production will prove out of line. In 1955, automen underestimated America's auto appetite; in 1956, they overestimated; they repeated again this year. Final calendar-year figure will be close to 6.2 million for the third best year in history, but well under the 6.5 million anticipated a year ago.

Steel—An uptrend in orders for fourth quarter delivery may help the industry to topple the 1955 record of 117 million tons. It may be some time before the industry

	1957	1956	1955	1954
Jan.	126.34	122.43	97.00	93.56
Feb.	139.29	129.56	98.71	96.45
Mar.	140.76	166.14	149.16	115.55
Apr.	132.67	145.20	109.52	122.76
May	157.95	155.53	110.50	98.54
June	121.57	189.13	139.00	112.42
July	128.31	165.50	111.76	91.68
Aug.	.....	168.70	106.20	94.06
Sept.	.....	130.35	136.80	88.43
Oct.	.....	143.38	123.52	95.41
Nov.	.....	138.50	118.09	88.66
Dec.	.....	117.76	139.85	102.49
Avg.	.....	147.68	120.01	100.00

Material Handling Institute Inc.



	Washers		Dryers	
	1957	1956	1957	1956
Jan.	331,314	393,717	144,621	166,243
Feb.	319,580	405,631	114,517	148,522
Mar.	286,205	405,744	83,668	113,031
Apr.	230,675	324,238	42,850	64,923
May	254,195	315,249	31,572	55,330
June	282,289	340,235	46,783	58,441
July	335,139	380,172	70,011	117,548
Aug.	.....	373,925	.....	144,537
Sept.	.....	402,631	.....	192,724
Oct.	.....	449,409	.....	206,929
Nov.	.....	357,935	.....	170,529
Dec.	.....	298,368	.....	162,953
Totals	.....	4,447,254	.....	1,601,710

American Home Laundry Mfrs. Assn.

has to operate at the unusually high rates of the last couple of years because capacity is high enough to meet almost any exigency (see STEEL, Sept. 16, pp. 79-81).

Inventories — Manufacturers will add about $5 billion to their inventories this year, which is considerably beneath the $5.5 billion to $6 billion added in 1956. Physical volume will be off even more because of price increases.

Population—Each month, the nation's population growth is equivalent to a city about one-third the size of Cleveland. On July 1, the total reached 171,229,000, about 1 million ahead of where the government thought it would be when the last long range forecast was made. Of equal significance is the fact that over the past year personal income has increased at an annual rate of 6.3 per cent. This means greater buying power for more people, which spells continued high demand from industry.

Trends Fore and Aft

• Sales of television receivers by Motorola Inc., Chicago, rose to a new high in August, reports Edward R. Taylor, executive vice president. He also says that sales of high fidelity phonographs doubled in 1956 over 1955 and anticipates that sales will continue the sharp gains of recent years and more than double the 1956 volume.

• Private housing starts climbed sharply in August to an annual rate of 1,010,000 units, reports the Labor Department. This was the best effort so far in 1957.

• "Total shipments for the eight-month period ended Aug. 31 were at a satisfactory level," reports Arthur Lehr, president of Bliss & Laughlin Inc., Chicago. "Incoming orders during the last few weeks give us indication of a heathier picture for the fourth quarter," he adds.

• Wholesale prices continued their upward trend in August, reaching a record of 118.3 (1947-49=100), according to the Bureau of Labor Statistics. A rise in all commodities other than farm and foods contributed greatly to the 0.1 point increase from July.

• Commercial and industrial loans to manufacturers of metals and metal products continue to dip. From June 26 to Sept. 4, the cumulative decline was $415 million, compared with $219 million in '56.

TM
Triple-Safe
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pushes safety records up— pulls chain costs down!

GAMMA RAY QUALITY CONTROL! X-Ray type testing of master, joiner and end links assures safe, trouble-free welds.

CONTROLLED ATMOSPHERE HEAT-TREATING on all popular sizes provides uniformity throughout the sling chain assembly.

EXCLUSIVE PATENTED TAYCO HOOKS! I-Beam type design... alloy steel construction and unique recessed grip mean extra safety!

REGISTERED! You get a certificate of test with every TM Alloy Chain. It bears the chain's guarantee . . . proof test . . . serial number.

Alleviate the squeeze on profits and tighten your grip on safety—switch to TM Alloy Steel Chain. Gamma Ray Quality Control . . . Controlled Atmosphere Heat-Treating . . . patented Tayco Hooks make it *Triple-Safe!* Never requires annealing! Tough—withstands abrasion, shock, grain-growth and work-hardness. Get *all* the facts! Write for Bulletin 13!

S. G. TAYLOR CHAIN CO., INC.
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Eastern Plant—Pittsburgh, Pa.

Chain is our specialty, not our sideline!

TAYLOR MADE
A GREAT NAME IN
Chain SINCE 1873

The next one will be "just like the first one" from this Heppenstall Die Block.
Die block dimensions: 13'2" x 2'7" x 1'4"
Weight before sinking: 23,830 pounds

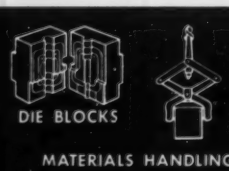
Heppenstall Die Blocks reduce sinking time . . . hold close tolerances for these 3500 lb. crankshafts

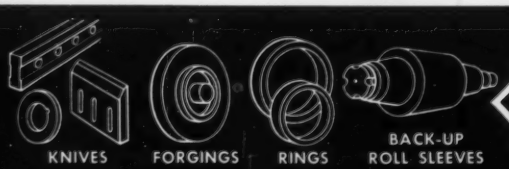
Reports from Park Drop Forge Company, Cleveland, point out two important performance benefits resulting from the Heppenstall Die Blocks used for this diesel crankshaft job. First, the machinability of Heppenstall's Hardtem Die Steel made it possible to sink the impression in a minimum of costly machining time. In addition, Hardtem's outstanding ability to hold dimensions under the hammer enabled the company to turn out close tolerance forgings throughout the entire production run. Since 1937, when the diesel trend began, the majority of locomotive crankshafts have been Park Drop forgings . . . and most of them from Heppenstall Die Blocks.

Forged on all six faces from special Heppenstall Steel, Hardtem and other Heppenstall Die Steels are manufactured in a wide range of hardnesses to match varying customer requirements of application and machinability. Veteran Die Sinkers know they can select a Heppenstall Die Steel that can be machined to greatest accuracy in minimum cutting time, yet will hold dimensions for maximum production runs. If you're looking for the best possible combination of die block machinability and service life, contact your Heppenstall Representative. He can help you quickly select the one best answer.

These five Heppenstall Warehouses carry stocks of the most popular size die blocks:

Bridgeport 5, Conn. • Detroit 32, Mich. • Indianapolis 27, Ind. • Los Angeles 22, Calif. • Pittsburgh 1, Pa.





HEPPENSTALL

... the most dependable name in die blocks

PITTSBURGH 1, PENNSYLVANIA

RICHARD K. DICKSON
gen. mgr. Trent Tube plant

ALBERT H. CLARKE
Crouse-Hinds mfg. v. p.

ROBERT K. STERN
Mid-Century Instrumatic pres.

ROBERT L. GRUNEWALD
GE gas turbine mfg.-mgr.

Richard K. Dickson was made general manager of **Trent Tube Co.'s** new plant at Fullerton, Calif., which will operate as a division of the main plant in East Troy, Wis. Mr. Dickson was chief metallurgist of Trent Tube, subsidiary of Crucible Steel Co. of America.

Albert H. Clarke was promoted to vice president - manufacturing at **Crouse-Hinds Co.**, Syracuse, N. Y. He is succeeded as vice president-engineering by **Russell P. Northup**, former vice president for Condulet sales. **John B. Crosby**, assistant to the president, succeeds Mr. Northup. **William A. McAuley** was made new products manager in the sales division.

William H. Ashton was made director of raw materials in the office of the vice president of **American Steel & Wire Div.**, U. S. Steel Corp., Cleveland. He succeeds **Jacob W. Cox**, made general superintendent of the Duluth Works.

Frank D. Brittain was elected vice president-sales for all diecasting operations of **Hoover Ball & Bearing Co.**, Ann Arbor, Mich.

National Supply Co.'s **Spang-Howarduct Div.**, Melrose Park, Ill., named **Raymond W. Clifton** plant manager; **Leo Rapp**, purchasing agent.

Joseph W. Rath was made superintendent; **T. A. Thompson**, assistant superintendent in the open hearth department of **Weirton Steel Co. Div.**, National Steel Corp., Weirton, W. Va.

Robert K. Stern was elected president, **Mid-Century Instrumatic Corp.**, New York. He was vice president and general manager of Fischer & Porter Co.'s data reduction and automation division.

American Manganese Steel Div., American Brake Shoe Co., Chicago, elected **Joseph L. Mullin** executive vice president. He was vice president of the division. **W. Frank Kelly** was made vice president-operations; **John E. Holtman**, assistant vice president-operations; **William E. Crocombe Jr.**, assistant vice president-sales.

Super Tool Div., Van Norman Industries, Detroit, promoted **Milton J. Steffes** from vice president-sales and engineering to vice president and works manager. **Lawrence A. McDonald** was made sales manager.

Marion Power Shovel Co., Marion, Ohio, named **Merle V. Lashey** manager of engineering; **Jack F. Weis**, assistant chief engineer for large and intermediate size machines; **Robert W. Bergmann**, electrical engineer.

Ralph R. Moore was appointed manager of **Curtiss-Wright Corp.'s** Buffalo extrusion plant. **Moncrieff H. Galloway** was named production control manager, metals processing division, Buffalo.

At the Ft. Madison, Iowa, division of **Anchor Metals Inc.**, **Wallace J. Anderson** was made executive manager; **Darrell W. McLemore**, production manager.

Robert L. Grunewald was made manager-manufacturing for **General Electric Co.'s** gas turbine department, Schnectady, N. Y. He was manager, component manufacturing and engine rebuild-production engine department, at Evendale, Ohio.

Caterpillar Tractor Co., Peoria, Ill., reorganized its manufacturing general office into three departments: Administrating the departments is **L. J. Ely**, named director of manufacturing. **Hugh Boggs** was named manager of planning and plant engineering; **Roy McCluskey**, manager of production control; **Dale Wright**, manager of quality control.

P. H. Spennetta joined **J. I. Case Co.**, Racine Wis., as director of engineering, industrial division. He succeeds **T. A. Haller**, named to head a newly established research and development center in Racine. Mr. Spennetta was formerly chief of research and testing for Caterpillar Tractor Co.

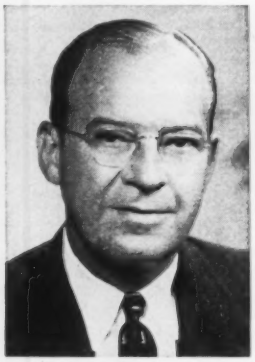
Robert A. Atkins was named manager of the newly created product development and sales research for **Sharon Steel Corp.**, Sharon, Pa., a department which will add new products, including alloys for the ballistic, aviation, and atomic energy fields.

D. L. Douglass, manager of parts and service of **Thew Shovel Co.**, Lorain, Ohio, was promoted to director of parts and service. **Carrol G. Turk** was made assistant to Mr. Douglass. **R. G. Thibaut** continues

LESTER E. BRION JR.

JOHN D. DRUMMOND

Peter A. Frasse administrative changes



DONALD K. BALLMAN

WILLIAM R. DIXON

Dow Chemical sales positions

as manager of the service department.

Peter A. Frasse & Co. Inc., New York, elected **Lester E. Brion Jr.** executive vice president; **John D. Drummond**, vice president-general manager of sales and warehouse operations. **N. Leroy Hammond Jr.** was made Philadelphia district manager.

Alan W. Smythe, vice president and general manager, **Thew Shovel Co.**, Lorain, Ohio, was elected president of **Byers Machine Inc.**, Ravenna, Ohio, subsidiary. He continues in his present capacities at Thew. **W. J. Allaback** was made vice president of Byers and also director of operations for Thew. **H. G. Dehnel** was made manager of Byers. **W. W. Blauvelt**, its former general manager, resigned that post to become director of business planning and control division of Thew, continuing as Byers' vice president.

Arvid Nihlen was made engineer of manufacture, **Griscom - Russell Co.**, Massillon, Ohio, subsidiary of General Precision Equipment Corp.

Robert Bevis was made assistant sales manager, domestic sales, **Cincinnati Milling Machine Co.**, Cincinnati.

Edward F. Kurzinski joined **Air Products Inc.**, Allentown, Pa., as manager of sales development engineering. He was laboratory division head at Linde Co.

Newton H. Willis, a vice president, was placed in charge of engineering at **Waukesha Motor Co.**, Waukesha, Wis. He continues to direct the railway division.

Donald K. Ballman, general sales manager, **Dow Chemical Co.**, Midland, Mich., was promoted to director of sales to succeed **Donald Williams**, now director of corporate relations. **William R. Dixon** was made general sales manager.

Howard H. Nichols was made sales manager, **Hazen Engineering Co.**, Pittsburgh. He was with Columbia-Geneva Div., U. S. Steel Corp.

James K. Nunan fills the new post of vice president-electronics, **Clevite Corp.**, Cleveland. He was general manager, Clevite Research Center.

Clifford A. Bussee was made engineering manager, electronics division, **Rheem Mfg. Co.**, Downey, Calif.

Clowes M. Christie was elected president, **Dayton Rubber Co.**, Dayton, Ohio, succeeding **A. L. Freedlander**, now chairman.

Richard W. Holmes was made sales manager, eastern division-north, **E. F. Houghton & Co.**, with headquarters in Worcester, Mass. He replaces **O. R. Kerst**, resigned. **Lewis R. Tharp** was made assistant sales manager, Detroit.

Thomas Allinson, vice president - marketing, **Daystrom Inc.**, Elizabeth, N. J., will also head the company's newly formed Controlonics Group.

Thomas W. Schaid was made manager of **Allmetal Screw Products Co.'s** new midwest division at Chicago.

Philip C. Sayres was elected a vice president of **American Can Co.**, New York.

Charles R. Beacham was elected vice president, **Ford Motor Co.**, Dearborn, Mich., and assistant general manager, Ford Div. At the tractor and implement division in Birmingham, Mich., **C. B. Richey** was made chief engineer, research engineering department; **A. C. Quinn**, manager of the engineering test department; **C. T. O'Harrow**, chief tractor engineer.

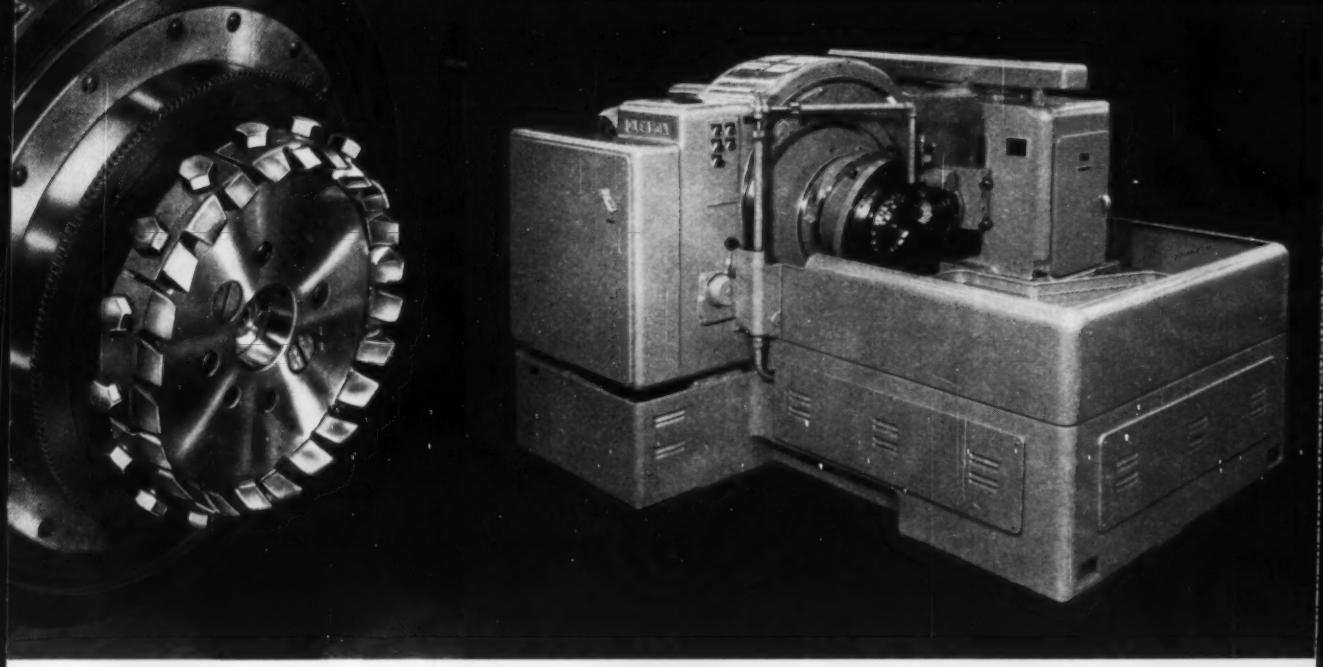
Carpenter Steel Co., Reading, Pa., appointed **Samuel E. Tyson** as metallurgist, stainless steels.

Herbert G. Schubert fills the new post of merchandising manager, **Cannon Electric Co.**, Los Angeles. **Alden C. Olsen** was made sales manager, Los Angeles division.

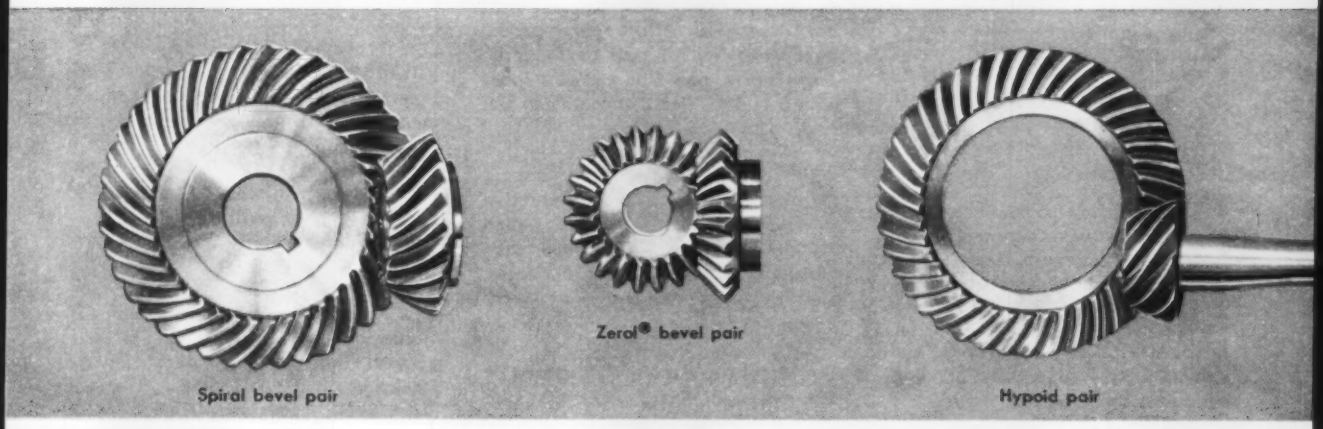
John L. Marshall was named assistant general sales manager, **Cyclone Fence Dept.**, American Steel & Wire Div., Waukegan, Ill., U. S. Steel Corp.

William E. Brandt was made assistant division superintendent of steel production, Fairless Works, Morrisville, Pa., **U. S. Steel Corp.** He succeeds **John D. Sutherland**, made division superintendent of the open hearth department, Homestead, Pa., Works.

Victor H. Lindberg was named division superintendent, structural rolling division, at **U. S. Steel Corp.'s** South Works, Chicago. He succeeds **Francis A. Snyder**, now assistant to general superintendent, South Works. Mr. Snyder succeeds **George S. Mican**, who moved to the Pittsburgh district as division



With *one* Unitool* Cutter and *one* machine



Spiral bevel pair

Zerol® bevel pair

Hypoid pair

you can produce all three types

Now it takes only a relatively small capital investment to equip a shop for producing prototypes or small quantities of spiral, Zerol® bevel and hypoid gears.

The new Unitool Method requires only one machine, the No. 116 Hypoid Generator shown above or the smaller No. 106, and one Unitool Cutter to rough and finish both gears and pinions of a particular combination.

A total of six Unitool Cutters cover gears and pinions of all designs from 1.3″ to 8.0″ cone distance, 0.4″ to 2.2″ face width, and 16 to 2.5 DP.

Simplified, slide-rule calculations make it possible for even inexperienced personnel to turn out gears of high quality.

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Gleason generators are versatile

The Unitool Method is only one of four that you can use on the No. 106 and 116 Generators. The same machines can be used for standard generating for medium gear and pinion production. In addition, for volume gear production they can be specially arranged for the Single-Cycle® Method where each tooth of a roughed-out, non-generated gear is finished in one cutting revolution of the Single-Cycle Cutter, or the Cyclex® Method where non-generated ring gears are both roughed and finished *in one cut* from the solid blanks.

For further information on the Unitool Method and for assistance with any design or manufacturing problem involving bevel gears, just write us.

67

GLEASON WORKS

Builders of bevel gear machinery for over 90 years

1000 UNIVERSITY AVE., ROCHESTER 3, N. Y.

JOHN M. PATTERSON
Beryllium Corp. sales mgr.

FRED ENGELHARDT
Byers purchasing director

GEORGE A. CHANDLER
Western Brass Mills plant mgr.

superintendent-rolling mills, Clairton Works.

John M. Patterson was made sales manager, **Beryllium Corp.**, Reading, Pa. He was assistant sales manager.

Fred Engelhardt was appointed director of purchases and traffic, **A. M. Byers Co.**, Pittsburgh. He has been purchasing agent.

Arthur F. Pelster was made vice president of aircraft products sales, **Leland Electric Co. Div.**, American Machine & Foundry Co., Vandalia, Ohio.

George T. Stevens was made sales manager, Metallon stamping plant, Canfield, Ohio, strip steel division, **Jones & Laughlin Steel Corp.**

International Harvester Co., Chicago, appointed **Harold W. Partheemer** manager, industrial engineering and construction department, succeeding **Otto A. Krueger**, retired.

Sidney S. Hulse was made general superintendent of production for the **Chevrolet** axle plant, Buffalo, General Motors Corp. Formerly plant production superintendent, he succeeds **Harold R. Main**, retired.

Dr. W. Kenneth Bock was made director of research, **National Malleable & Steel Castings Co.**, Cleveland. He succeeds the late **Harold Johnson**. Dr. Bock was manager of metallurgical research.

Allan B. Clow was named vice president-marketing, **American Cyanamid Co.**, New York, to succeed **Dr. W. G. Malcolm**, recently made president. **Anthony C. McAuliffe** was made vice president-engineering and construction.

George A. Chandler was made manager; **Melvin L. Henry**, production manager at the New Haven, Conn., plant of **Western Brass Mills Div.**, Olin Mathieson Chemical Corp. **Arnold G. Renken**, who resigned as production manager because of illness, continues as technical adviser to the Western Brass Mills' nuclear fuels and metallurgical research divisions. **Kenneth Soper**, former superintendent of mill products at New Haven, now fills a similar post at East Alton, Ill., succeeding Mr. Henry.

Finn Jensen, former purchasing agent in charge of nonproductive purchases at Carrier Corp., joined **Avildsen Tools & Machines Inc.**, Chicago, as district sales manager, Celfor Tool Div. He is at Syracuse, N. Y.

Sun Steel Co. appointed **Richard N. Haynes** and **Terry Donnelly** district sales representatives for Michigan with headquarters in a newly opened office at 202 Burwall Bldg., Kalamazoo, Mich. They were both with Solar Steel Corp.

Donald L. Colwell was elected vice president in charge of laboratories and research for **Apex Smelting Co.**, Chicago.

William H. Peters joined **R. D. Werner Co. Inc.**, New York, as products division manager. He was general sales manager of Brown Products Corp.

Ralph J. McKeever was named general manager, **Voight Machine Corp.**, Los Angeles.

Kenneth H. Meyer was made director of engineering, **C. B. Hunt & Son Inc.**, Salem, Ohio. He succeeds **C. S. Chessman**, resigned.

George R. Lewis was made plant superintendent of **Northwestern Tool & Engineering Co.**, Dayton, Ohio.

Fred J. Purdy fills the new post of manager of marketing for **Westinghouse Electric Corp.'s** welding department at Buffalo.

L. W. Moore was made assistant general manager of **Wheeling Steel Corp.'s** Steubenville, Ohio, Works.

Lawrence W. Cunningham was made southern regional sales manager, **Kelite Corp.** He is at Beaumont, Tex.

George Kepley was made district manager, industrial division, Beckley, W. Va., office of **Jeffrey Mfg. Co.** He succeeds **James Burke**, resigned.

Edwin O. Boldgett was elected vice president-research and development, **Commercial Controls Corp.**, Rochester, N. Y.

A. Merrill Smith was made domestic field sales manager, **Austin-Western**, Aurora, Ill., construction equipment division, Baldwin-Lima-Hamilton Corp.

Frederick J. Griffiths was made general manager, **Bossert Div.**, Rockwell Spring & Axle Co., Utica, N. Y. He succeeds **Charles A. Cooper**, promoted to vice president.

OBITUARIES...

Roger L. Dailey, 57, eastern division manager, **National Supply Co.**, died in Toledo, Ohio, Sept. 4.

William J. Farrell Jr., 54, president, **Bearings Inc.**, Milwaukee, died Sept. 6.

C. A. Kroos, 77, executive vice president, **Kohler Co.**, Sheboygan, Wis., died Sept. 3.

Arthur R. McHenry, 76, purchasing agent, **Symington-Gould Corp.**, Depew, N. Y., died Sept. 9.

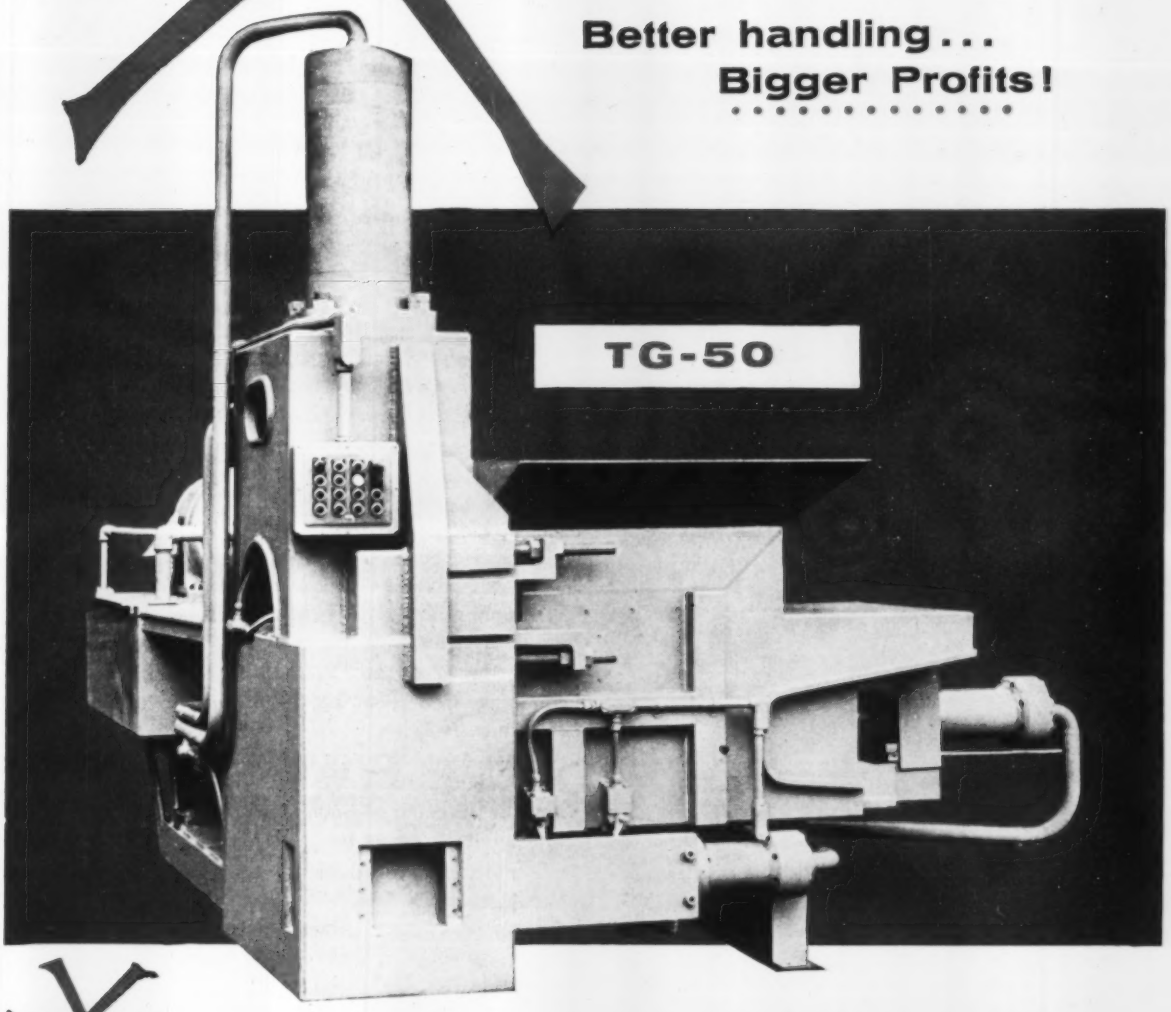
HARRIS PRESSES

move

scrap

fast...

Better handling...
Bigger Profits!



The new Harris TG-50 Baler is designed especially for baling materials uniform enough for conveyor type feeding. All bales measure 8" x 8" x variable length, and can be made at a rate of 120 bales of non-ferrous materials per hour. This press sits on top of the ground and can be moved with a minimum of effort.

Talk with a man from Harris

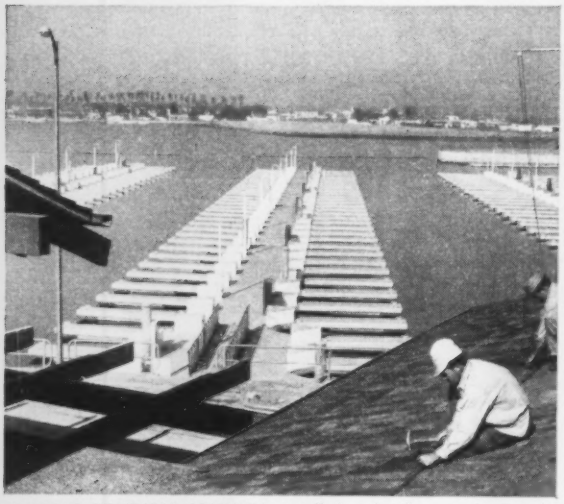
HARRIS FOUNDRY & MACHINE CO.

Reclamation Engineers Since 1889

CORDELE, GEORGIA

ALAMITOS BAY MARINA BASIN #1, built by the City of Long Beach, Calif: S. E. Vickers, city manager; J. D. Gilkerson, city engineer; B. E. McCune, deputy city engineer; Thomas G. Marchese, project engineer. Engineers: Moffatt & Nichol Inc., Long Beach. Electrical contractor: Ets-Hokin & Galvan, Wilmington, Calif. Everdur Conduit furnished by General Electric Supply Company, Long Beach, Calif.

Over two miles of Everdur Conduit guards electric service at new Long Beach, Calif., marina unit, serving 342 boats



EVERDUR ELECTRICAL CONDUIT is installed under floating docks, only inches above the water. Plug-in electrical outlets are located at lockers by each slip and on lighting standards. *Below:* Everdur Electrical Conduit is available in two wall thicknesses—R. C. and E. M. T.

PHOTOS COURTESY INDEPENDENT-PRESS-TELEGRAM, LONG BEACH, CALIF.

The City of Long Beach, Calif., is in the process of transforming its Alamitos Bay area from tide flats and a massive mosquito factory into one of the finest small boat harbors in the world.

The first boat basin and marina unit, which can accommodate 342 boats, is now complete. The floating docks are well lighted and at each slip, boat owners have plug-in electric service and a fresh water tap. All electrical wiring from the shore out is protected by Everdur® Electrical Conduit – well over 11,000 feet, ranging from ½" nominal size to 3". In addition, all fittings and boxes are of Everdur.

Everdur Electrical Conduit – made from one of Anaconda's copper-silicon alloys—never rusts and offers high resistance to other types of corrosion. It provides dependable year-after-year protection wherever water and corrosive atmospheres are a problem – or where conduit must be buried or embedded in concrete. Everdur is also tough – it stands up under movement and vibration.

For detailed information, write: The American Brass Company, Buffalo Division, Buffalo 5, N. Y. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

87136

EVERDUR

ELECTRICAL CONDUIT

an ANACONDA® product

made by The American Brass Company

CORROSION RESISTANT • STRONG • NONMAGNETIC • WORKABLE • WELDABLE

Plate Stretcher

Kaiser orders unit with 30-million lb pulling power for installation at Ravenswood, W. Va., mill

A PLATE stretcher with pulling power up to 30 million lb will be installed by Kaiser Aluminum & Chemical Corp., Oakland, Calif., in its aluminum rolling mill at Ravenswood, W. Va. It will be built by Hydraulik G.m.b.H. of Duisburg, Germany, with installation by 1959.

Kaiser officials claim it will possess nearly twice the power of the largest stretcher now in operation. The huge machine will be capable of gripping the ends of a 60-ft plate of a high-strength aluminum alloy and lengthening it as much as 5 ft. It will be able to handle a maximum cross section of 640 sq in. Within the over-all limit, it will accommodate thicknesses up to 6 in. and widths up to 160 in., in lengths from 17 to 60 ft.

Demand Grows—With associated heat treating and ultrasonic testing equipment, the stretcher will be installed to help satisfy the increasing demand of aircraft builders for larger and thicker plates in the strongest aluminum alloys. In addition, demand is growing for heavy aluminum alloy plates for uses in the transportation and shipbuilding industries.

The stretching action relieves residual, internal stresses to provide better physical properties in the metal. Use of stress-relieved aluminum plates is highly advantageous in the machining of intricately shaped parts, such as wing sections, spars, and other structural members.

Light gage sheets and foil are now being cold rolled and hot-line plate and sheet rolling facilities are under construction at the Ravenswood mill. Kaiser Aluminum also is building a reduction plant to produce primary aluminum at that mill.

Boice Expands in West

Boice Gages Inc., Hyde Park, N. Y., has added a new manufacturing division, Boice Threads Inc., 2302 E. 96th St., Los Angeles 2, Calif. It will make thread plug and thread ring gages. A. A. Ruffalo, president of the former Gage Plating Corp., will remain as head of the west coast division of Boice Gages Inc. Boice purchased Nilsson Gage Co. Inc., Poughkeepsie, N. Y., last June.

Rawlins Buys Warehouse

Rawlins Bros. Inc., Los Angeles, has assumed ownership of the west coast operations of Solar Steel Corp., Cleveland. Services offered by Rawlins include decoiling, flame cutting and grinding, power saw cutting, shearing, slitting, and roller leveling. Solar will continue its steel warehousing and processing operation in other principal cities, including Cleveland, Chicago, Philadelphia, Detroit, and Baltimore.

Siegler To Make New Line

Siegler Corp., Centralia, Ill., through its Hallamore Electronics Co. division, has been licensed by Western Electric Co., New York, to manufacture telephone equipment. The agreement, one of the first issued by Western Electric to an independent supplier, covers the production of communications-type equipment. Amplifier stocks are being built up at the Hallamore plant in Anaheim, Calif.

Daystrom Reorganizes

Daystrom Inc., Murray Hill, N. J., organized its Daystrom Controlonics Group to provide industry with entire electronic systems for the instrumentation and automatic control of industrial processes. Formation of the Controlonics Group follows the recently announced organization of the Avionics Group which is specializing in providing complete systems for the guidance and control of aircraft and missiles. Thomas Allinson, vice president in charge of marketing, has been appointed operating vice president of the group in addition to his present responsibilities.

Daystrom units involved in the reorganization include: Weston Electrical Instrument Corp., Newark, N. J.; Daystrom Systems Div.,

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...the original alloy steel chain

TO SERVE YOU BETTER: Herc-Alloy chain assemblies can now be ordered with either of two types of coupling links.

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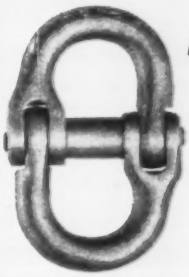

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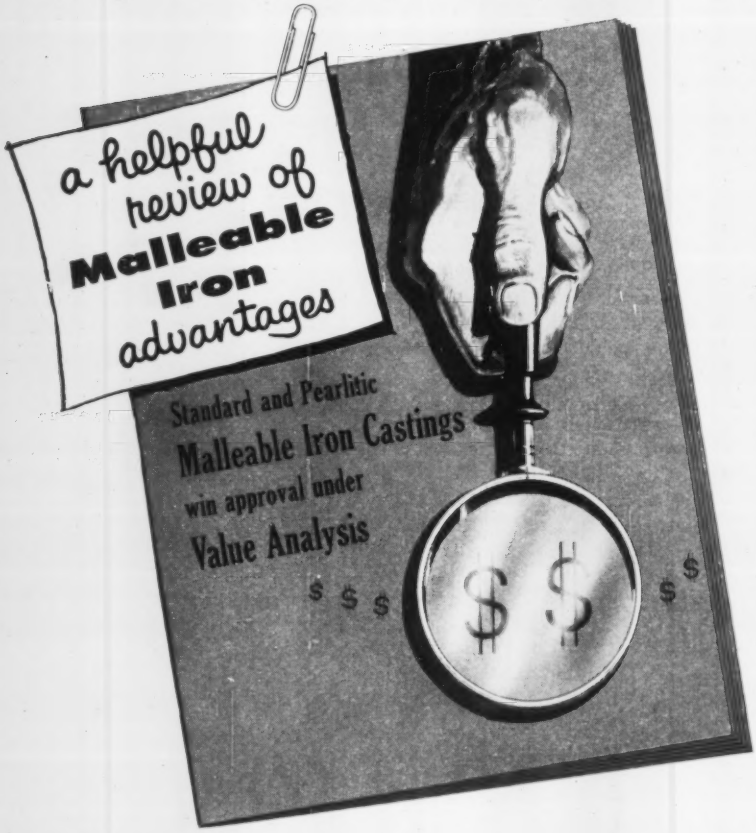

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How about Malleable?

This new publication—"Standard and Pearlitic Malleable Iron Castings win approval under Value Analysis"—is now available to you. It shows you how the use of Malleable will pay big dividends. Just write for the "Value Analysis brochure".

Consult a malleable foundry engineer at the drawing board stage

Malleable FOUNDERS' SOCIETY

1800 Union Commerce Building Cleveland 14, Ohio

La Jolla, Calif.; and Daystrom Electric, Poughkeepsie, N. Y.

ESC Opens New Division

ESC Corp., Palisades Park, N. J., has opened its Electronic Components Div. for the development and manufacture of specialty transformers and associated electronic components. John F. Nielsen is director of the division.

Levinson Steel Expands

Levinson Steel Co. has doubled the size of its warehousing and fabricating facilities and is formulating plans to expand its warehousing service for hot rolled and cold finished bars, as well as stainless and alloy materials. The firm operates stock and service centers at Pittsburgh and McKees Rocks, Pa.

NEW ADDRESSES

E. F. Myers, chairman and president, and **Mrs. Mabel G. Brace,** vice president and treasurer, Ironton Fire Brick Co., have moved to the firm's general offices at Ironton, Ohio. They were formerly at the Jacksonville, Fla., offices.

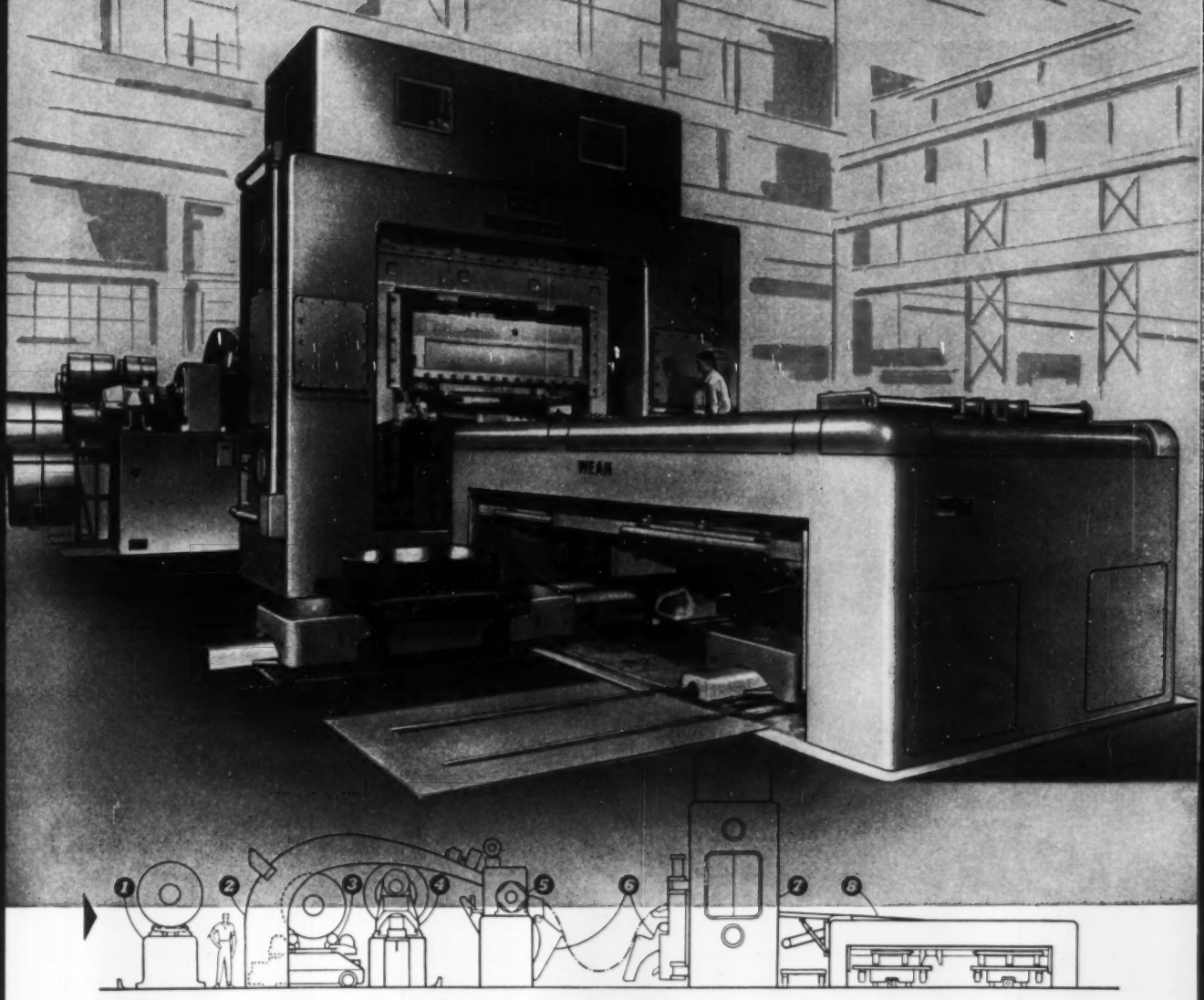
Screw Research Association moved its offices to 1015 Chestnut St., Philadelphia 7, Pa. Walter H. Gebhart has been elected president to succeed the late Harry Mayoh.

Corhart Refractories Co. moved its sales and administrative offices to 940 Commonwealth Bldg., Louisville 2, Ky.

Babcock & Wilcox Co.'s Tubular Products Div. moved two district sales offices to 731 James St., Syracuse 3, N. Y., and 66 Central St., Wellesley 81, Mass.

Bostitch Inc. moved to its new $6-million factory and headquarters in East Greenwich, R. I.

Executive offices of **Robertshaw-Fulton Controls Co.** have been moved to 911 E. Broad St., Richmond 19, Va. John A. Robertshaw,



1. Ready stand
2. Threading arms
3. Coil buggy
4. Cone-type Uncoiler
5. Leveler
6. Threading tables
7. "Flying-Press"
8. Automatic Piler

'Flying Press" Production Line

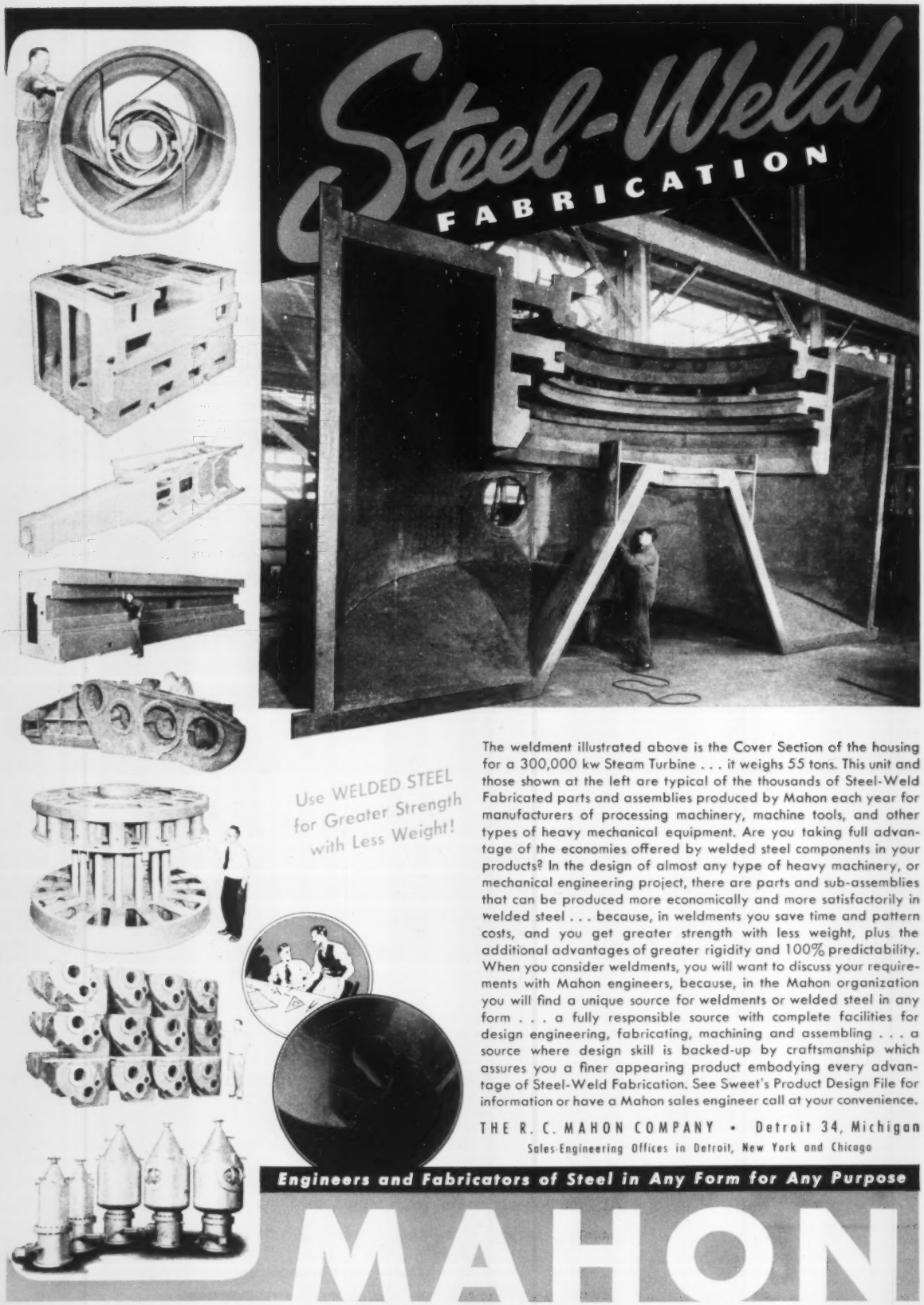
250 ton press line quadruples production of large heavy gauge parts

Dramatic proof of new production horizons is seen in the performance of this 250 ton "Flying-Press" production line engineered by Wean. Large heavy gauge automotive parts, formerly produced on modern presses, at rates up to 20 strokes per minute, are now produced on this Wean line at 90 strokes per minute.

The press is a 250-84-60 "Flying-Press." All components, from ready stand to stacking table, were engineered by Wean to work together as a single unit. Thus, the complete line is capable of producing at maximum press speeds. Consider, for a minute, how such production equipment can lower your per-unit manufacturing costs.

20 tons or 300 tons, whatever your press requirements, you will want the complete story on the "Flying-Press" and related units. Write today for your copy of the Wean "Flying-Press" Brochure.

Wean Equipment Corporation
CLEVELAND 17, OHIO



Use WELDED STEEL
for Greater Strength
with Less Weight!

The weldment illustrated above is the Cover Section of the housing for a 300,000 kw Steam Turbine . . . it weighs 55 tons. This unit and those shown at the left are typical of the thousands of Steel-Weld Fabricated parts and assemblies produced by Mahon each year for manufacturers of processing machinery, machine tools, and other types of heavy mechanical equipment. Are you taking full advantage of the economies offered by welded steel components in your products? In the design of almost any type of heavy machinery, or mechanical engineering project, there are parts and sub-assemblies that can be produced more economically and more satisfactorily in welded steel . . . because, in weldments you save time and pattern costs, and you get greater strength with less weight, plus the additional advantages of greater rigidity and 100% predictability. When you consider weldments, you will want to discuss your requirements with Mahon engineers, because, in the Mahon organization you will find a unique source for weldments or welded steel in any form . . . a fully responsible source with complete facilities for design engineering, fabricating, machining and assembling . . . a source where design skill is backed-up by craftsmanship which assures you a finer appearing product embodying every advantage of Steel-Weld Fabrication. See Sweet's Product Design File for information or have a Mahon sales engineer call at your convenience.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago

Engineers and Fabricators of Steel in Any Form for Any Purpose

MAHON

chairman, and John A. Robertshaw Jr., vice president, will continue to make their headquarters in Greensburg, Pa.

NEW PLANTS

Joseph T. Ryerson & Son Inc.'s new steel service plant at 6701 E. English Ave., Indianapolis, Ind., is now open for business. The firm is the warehousing subsidiary of Inland Steel Co., Chicago. Steel handling and cutting equipment include a high speed friction saw, shears, hacksaws, a mechanized flame cutting machine, and two bridge cranes. Robert L. Larson is general manager of the new facility.

Vac-U-Lift Co., manufacturer of material handling systems, will build a plant at Salem, Ill., which will have four times the firm's present manufacturing space.

Canadian Titanium Pigments Ltd., a subsidiary of National Lead Co., New York, officially opened it titanium pigment plant at Varennes, Que.

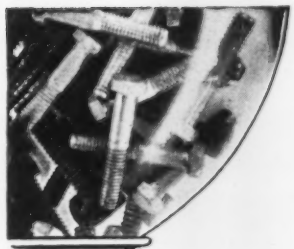
Parker Rust Proof Co., Detroit, opened a plant in St. Louis to manufacture products for the surface treatment of metals. Ronald P. Gajdos is plant manager.

Bohn Aluminum & Brass Corp., Detroit, has established a facility in Holland, Mich., to make extruded decorative trim. Equipment includes facilities for plain and color anodizing, decorative painting, silk screening, buffing, etching, chemical brightening, and forming and fabricating operations in a wide range of aluminum sizes and shapes.

Benjamin F. Shaw Co., Wilmington, Del., is placing in operation its branch plant in Tuscaloosa, Ala. The company will manufacture stainless steel pipe and will install the pipe in some projects.

National Can Corp., Chicago, purchased the can manufacturing facilities of the former Phillips Packing Co., Cambridge, Md. The

(*Please turn to Page* 114)



...the perfect way **NOT** to buy fasteners!

When you purchase FASTENERS, your first considerations should be given to quality, delivery and prices.

Chandler, as a leading manufacturer of cold forged cap screws, takes the same considerations. Mass production is only part of their story . . . but absolute control during every phase of production means top quality and uniformity.

Realistic pricing is important . . . and is followed.

If your requirements include automotive, Place self-locking, connecting rod or aircraft engine bolts in high carbon alloy and stainless steels, check with Chandler today. They are prepared to produce special heads, drilled heads and shanks, and ground bolts to tolerances as close as 0.0005-inch.

Write today for literature.

Specialists in Thread-Rolling after Heat Treating.

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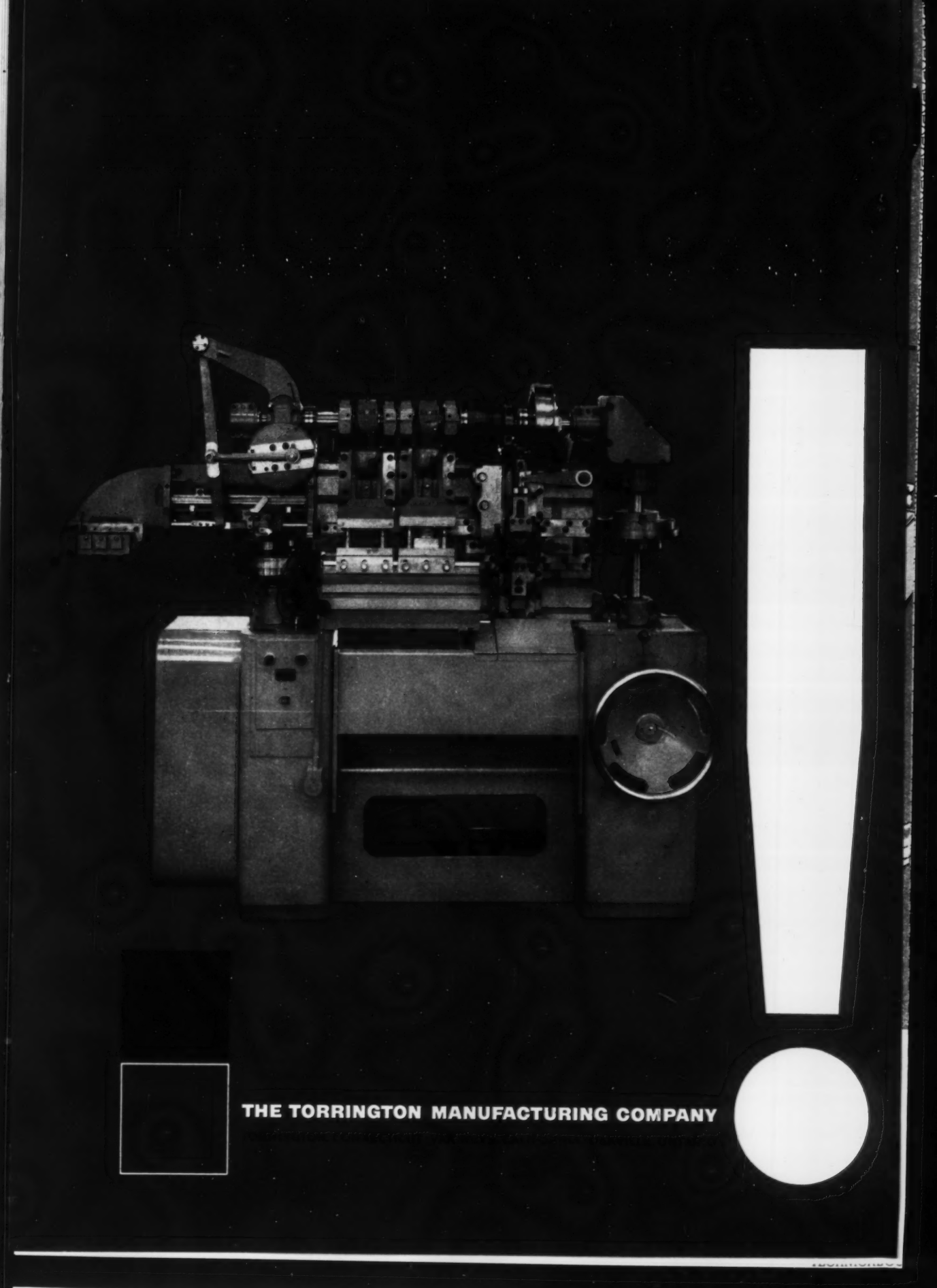
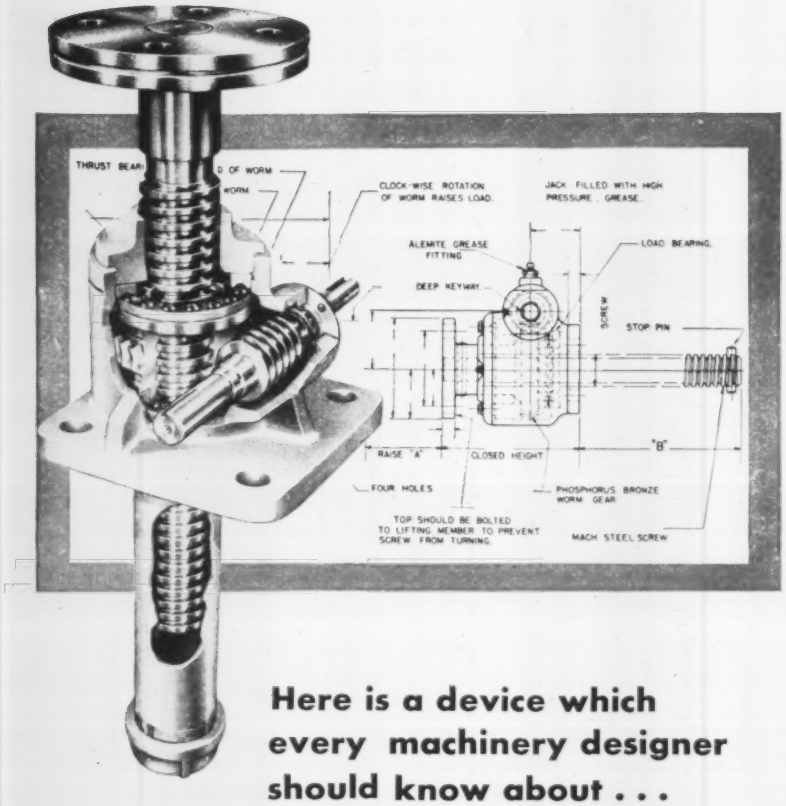
The Torrington Verti-Slide!

This important innovation in the basic field of 4-slide production equipment offers so many advanced design features, performance advantages and cost-cutting facilities that it is making national news as a development of major interest to U. S. industry.

NATIONAL NEWS

For the Torrington *Verti-Slide* was designed to meet a fundamental need for greater versatility, lower tooling cost, faster set-up time and reduced floor space. We urge you to investigate the *Verti-Slide* in detail at the Metal Show, Booth 1567, or through direct communication with our Machine Division.


THE TORRINGTON MANUFACTURING COMPANY



Here is a device which every machinery designer should know about . . .

DUFF-NORTON WORM GEAR JACKS

Duff-Norton worm gear jacks provide a purely mechanical means for accurate positioning of loads weighing as much as several hundred tons and maintaining them indefinitely without creep. They will operate in any position, and functioning as components of machinery and equipment they can raise and lower loads, apply pressure or resist impact. Jack capacities range from five to 50 tons. When two or more jacks are connected by means of shafting and mitre gear boxes they lift in unison, even when the load is unevenly distributed. They are available with standard raises up to 25 inches, and will provide exactly the same raise for years without adjustment. Worm gear jacks are suitable for operation at ambient temperatures up to 200°F.

Thousands of these jacks are in use on feeding tables, tube mills, welding positioners, pipe cut-off and threading machines, testing equipment, aircraft jigs, loading platforms, rolling mills, conveyor lines, arbor presses, and numerous other types of equipment. If you have a positioning problem, write for complete information, requesting bulletin AD34BB, which includes drawings and full specifications.

DUFF-NORTON **Duff-Norton Jacks**

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COFFING HOIST DIVISION: Danville, Illinois

Ratchet Jacks, Screw Jacks, Hydraulic Jacks, Special Worm Gear Jacks, Ratchet Hoists, Electric Hoists, Load Binders, Spur Gear Hoists

(*Concluded from Page* 111)

plant has a capacity for producing more than 3 million cans a day.

Jones & Laughlin Steel Corp., Pittsburgh, purchased the Lebanon, Ind., plant of Geuder, Paeshke & Frey Co., Milwaukee. The plant makes steel ironing tables and galvanized ware and will be operated by J&L's Container Div. Elliott Thomas will continue as plant manager.

Federal Tool & Mfg. Co., Minneapolis, opened a short-run stamping plant in North Hollywood, Calif. The property will be operated as the Federal Stamping Co. under the co-managership of William Bloomer (production) and Harold Griffiths (sales).

Electric Machinery Mfg. Co., Minneapolis, is erecting a 100,000 sq-ft plant. The firm makes large motors, generators, and control equipment. The expansion program will be a multimillion dollar project.

CONSOLIDATIONS

American Machine & Metals Inc., East Moline, Ill., purchased the name of **Rahm Instruments Inc.**, Westbury, N. Y., along with other assets. Rahm designs and fabricates intricate electromechanical instruments for aircraft and missile applications. As the Rahm Instruments Div., it will function as an adjunct to the Sellersville, Pa., plant. American Machine recently purchased **Hunter Spring Co.**, Lansdale, Pa., maker of fatigue testers, springs, force indicators, and metal stampings.

Parker Appliance Co., Cleveland, is purchasing **Hannifin Corp.**, Des Plaines, Ill., manufacturer of hydraulic and air power cylinders and presses, and miscellaneous components used in liquid, gas, or air pressure systems.

Nickel Cadmium Battery Corp., Easthampton, Mass., has been purchased by a wholly owned subsidiary of **Gould-National Batteries Inc.**, Trenton, N. J.

BOHN EXPANDS EXTRUDED TRIM FACILITIES TO ALL INDUSTRY!

One of America's oldest extruders, with years of anodizing and fabricating experience, Bohn now offers:

- Complete facilities for plain and color anodizing, decorative painting, silk screening, buffing, etching, chemical brightening, fabricating!
- Complete quality control—a prime requisite for the best possible finished products!
- Extruded trim in a wide range of sizes and shapes!
- Design assistance by experienced Bohn Engineers and Metallurgists!

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TECHNICALO

collect more dust for fewer dollars!

New 16-page booklet gives all the facts on AAF's improved Type W ROTO-CLONE

Here are the facts on the very latest improvements in AAF's Type W ROTO-CLONE—the "hottest" wet dust collector in industry since 1937. This 16-page booklet is chock full of data on arrangements, dimensions, performance characteristics, engineering data, and humidifying action.

The distinguishing feature of the Type W is the addition of water sprays to the basic principle of dynamic precipitation. This results in collection of even the lightest and finest dust particles and delivers collected dust in a slurry for easy disposal.

Get all the facts. Send this coupon today!

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Please send me Bulletin 274B which describes AAF's wet-collecting Type W ROTO-CLONE.

Name_____

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Technical Outlook

CO_2 SHELL MOLDING—Close tolerances of shell molding and the time and money savings of the CO_2 process have been combined, says National Cylinder Gas Co., Chicago. Because all operations are carried out at room temperature, aluminum or plastic patterns can be used instead of the steel ones required to withstand the heat of conventional shell molding. One firm reports casting tolerances of ±0.002 to 0.004 in. per inch. Another foundry says it holds 0.010 in. per inch tolerances on complex impellers. Molds can be as thin as ½ in.

ISOTOPES REPORT— The AEC announced that this month marks its 100,000th shipment of radioisotopes from the Oak Ridge National Laboratory since the program started about 11 years ago. More than 4000 organizations are licensed to use radioisotopes; many others have received small quantities of radioactive material under general license.

OXYGEN IN COLUMBIUM— Researchers at Battelle Memorial Institute have developed a diffusion-extraction method for analysis where mean deviation of results at the 0.019 weight per cent oxygen level is less than 0.001 per cent. It's based on studies which showed that oxygen can be extracted from columbium at 2000° C in a vacuum.

ALUMINIZING VALVES— Up to 3500 auto valves can be aluminized per hour in a new vertical high frequency machine developed by Lindberg Engineering Co., Chicago. A conveyer system (it's loaded and unloaded automatically) wrapped around the 14-ft-high cabinet moves the valves through the various operations. A metallizing gun sprays the preheated valves with molten aluminum; they are heated to form a hard, heat-resistant iron-aluminum alloy surface.

GLASS COATED TOOLS— A. O. Smith Corp., Milwaukee, is experimenting with glass coated punches and dies for deep drawing metal stampings. Results so far are encouraging. The company also has been working with glass coatings for the hot forming of metals.

LARGE STRETCH FORMER— What's said to be the largest radial draw former ever built is on its way to Convair Div. of General Dynamics Corp., San Diego, Calif. It will handle parts up to 40 ft long and can form one-piece circular bulkhead sections up to 12 ft in diameter. It was built by Cyril Bath Co., Solon, Ohio.

CERAMIC ADHESIVE—After testing 24 ceramic adhesives, the Department of Commerce reports: Shear strengths varied from 1200 psi at room temperature to 800 psi at 1000° F. Best performer: A porcelain enamel with a thermal expansion approaching that of ingot iron.

CHEAPER, PURER METALS— A new, inexpensive process for producing high melting point metals from their oxides yields a purer product than present methods, say research men at Illinois Institute of Technology. The method has been used to produce titanium, zirconium, chromium, hafnium, columbium, and vanadium. The oxides are reacted with aluminum under conditions that completely remove oxygen.

DESIGN BY COMPUTER— RW-300, a new digital computer which Ramo-Wooldridge Corp., Los Angeles, is making for use as a master control in manufacturing processes, was designed by another computer, an 1103A Univac. No circuit diagram of the RW-300 exists. The Univac "tested" the machine before it was built. It was put together from wiring instructions printed out on tape.

Metalworking Outlook—p. 73 *Market Outlook—p. 153*

Operator joins heavy magnesium extrusion and casting to a ⅝-in. plate for dock ramp. Single fillets such as this can be laid at 30 in. per minute. Penetration is about 3/32 in.

Magnesium Welded Faster

Cleveland company modifies standard, inert gas, manual welder. It claims that fabrication time is cut 80 per cent. Electrode contact does the trick

Here is a cross section of ⅝-in. plate with etched weld nugget. Weld requires three passes, two to fill the joint and one to clean up the opposite side

THE operator in the photo (left) is welding a magnesium plate with standard equipment (slightly modified) at 30 in. per minute. Speeds up to 80 in. per minute are possible on thicknesses of ⅛ in. or less.

The significance: Ray Miles, president, Lite-Line Industries Div., Copperloy Corp., Cleveland, says: "It is now economical to fabricate lightweight, heavy-duty equipment from thick magnesium plates."

Here are some of the outstanding features of the technique:

- It welds butt joints up to ⅜ in. thick in a single pass.
- Joining costs are from one-third to one-half those of tungsten arc (Tig) method.
- Speed and deeper welds cut fabrication time up to 80 per cent.

Invention—The reason for the success is a patented electrode contact inside the pistol grip. It is a simple device which eliminates arcing and flashing caused by poor electrical contact between the electrode wire and current carrying parts.

In standard models when burnback occurs, the wire fuses to the contact. The operator must shut down until the head can be disassembled and repaired.

Such delays average more than 15 minutes per shutdown, forcing operators to use the slower tungsten arc (Tig method).

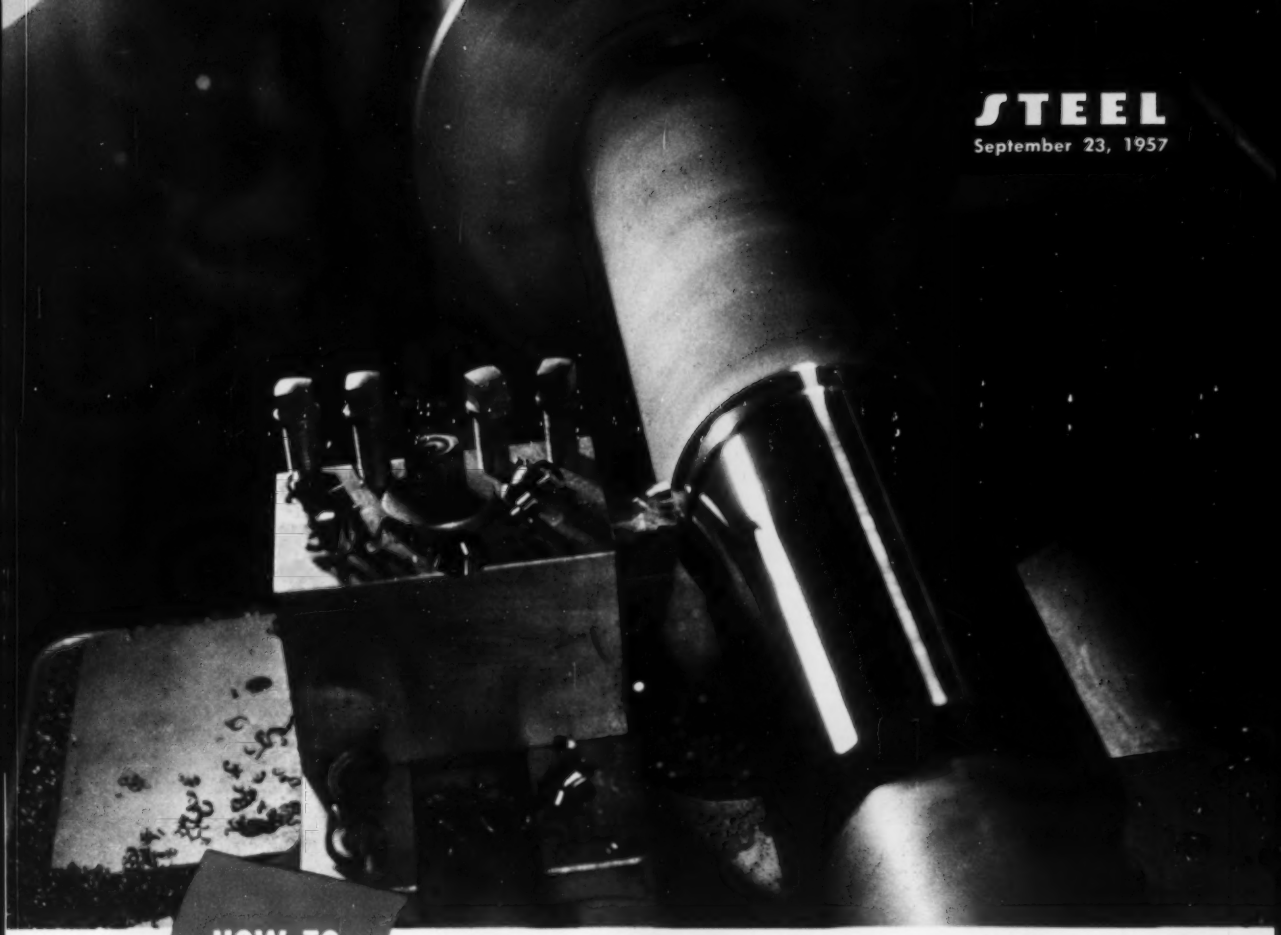
Tests—The variety of products made by Lite-Line Div. affords ample opportunity to test the device. Examples: Dock boards, yard ramps, flatcar aprons and similar material handling equipment. The firm also handles contract fabrications.

Some welds are 30 ft long. Material thickness ranges from ⅛-in. plates to heavy castings.

Easy To Use — The firm also found that its employees could learn the process in a short time. Several men with an average mechanical aptitude have made satisfactory welds after one day's training. Bend tests, etching, and tensile strengths show that welds are sound and strong.

Mr. Miles sums up with this statement: "Welding is a quick, easy method of joining. Now that the speed problem has been improved, look for more products made from magnesium."

STEEL
September 23, 1957



Carbide cutting tool Carboloy grade 350 bites into a rough forging (AISI 1045 steel) at 650 surface feet a minute. Feed is 0.016 in. per revolution; depth of cut is 0.4 in. Removal rate is 27 cu in. of metal a minute

HOW TO GET MORE FROM Machine Tools

"AT LEAST 75 per cent of today's machine tools aren't being forced to produce up to their capabilities," metalcutting authorities tell STEEL. Such "under-use" has several explanations:

1. "Many production men are running a $50,000 machine tool to baby a $10 cutter," says Harry Conn, chief engineer, Scully-Jones & Co., Chicago.

2. Improvements in machines and tooling have led to practical feeds and speeds that were unthinkable a few years ago. For one reason or another, users are not taking full advantage of them.

3. The pressure to "get out the work" has been so great in nearly every plant that there has been little time to improve techniques which are adequate now.

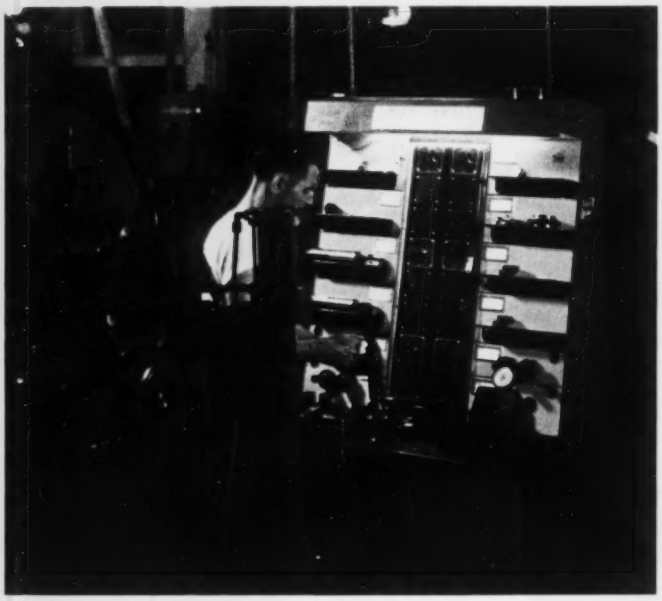
This article offers a program that will help you get more work out of your machines at less cost. Scully-Jones calls it "Optimation." Others talk in terms of machine productivity.

Where To Start—Nearly everyone who has worked with the problems of getting more out of machine tools admits it is a full-time job. A plant manager warns: "No program can be worth a damn unless someone is responsible for it."

The man you appoint should have these qualities: He must be able to organize a program and sell it to foremen and operators; he must know machining and tooling.

Outline for Program—If your machine tools have adequate horsepower and rigidity, here are things you can do with little or no capital

Motorshafts are turned with throwaway cutting tools at Reliance Electric & Engineering Co., Cleveland. The switch from inserts (that had to be ground) reduced costs from $155 to $51 a month. A second machine brought total savings to $208 a month



Operator Raymond Van Vactor presets a tool for Conomatic chucking machine at GE's Appliance & Television Receiver Div., Louisville. Tool board (built by Scully-Jones & Co., Chicago) has counters that record machine cycles, stop the machine, and turn on a light when a tool is worn. Normally, it takes about 4 minutes to change a tool. Here, with quick-change tools, all 12 are changed in 9 minutes. Racks are for tools ready to use

outlay. All will help boost machine performance. Some will cut costs.

1. *Tooling Refinement:*
   Find optimum speeds and feeds.
   Find optimum tooling, including throwaways and presets.
2. *Design:*
   Use realistic tolerances.
   Try to avoid special shapes and threads that call for special tools.
   Take advantage of developments in free-machining materials.
3. *Mechanization:*
   Check for chances to use such helps as automatic loading, unloading, and gaging.
   Consider automatic controls, including numerical.
4. *Chipless machining:*
   Check the dollar side of using precision castings, forgings, seamless tubing and other forms of stock that will let you get away with minimum machining.

TOOLING

It's better than even money that some machines in your plant aren't running fast enough to give you minimum cost per piece.

The Ideal—The perfect cutting speed is measured in dollars. It's the one that meets your production requirements and gives you the lowest cost per piece. Tool longevity by itself is no criterion on a machining job; the real goal is economical life. Sometimes, 4 minutes is better than 4 hours.

How To Figure Tool Life—The formula on page S-3 for figuring tool life is part of a comprehensive machinability system developed by Dr. W. W. Gilbert, Machining Development Laboratory, General Electric Co., Schenectady, N. Y. It enables you to calculate optimum tool life in minutes. With that information you can step up cutting speeds accordingly.

Handling Short Runs—Say you're going to run only 10 or 20, and the life of the cutter is not used up. George Meyer, general superintendent, Warner & Swasey Co., Cleveland, has an answer. In his plant: "Machine operators are advised to burn up the single-point tool. If a production run is for ten parts, he's to set speeds and feeds so the tool is nearly shot at the end of the run. You can't always call it that close, but the end result is to stop babying the tools and to boost production rates."

Another Approach—After you boost speeds to give you the lowest costs per piece, you should explore other areas of "under-use."

If you're working with carbides, for example, try throwaway cutting tips. They can give you another boost in speed and productivity.

How Throwaways Help—From the tool life formula it's apparent that anything you can do to lower tool replacement costs will make a shorter economical tool life possible—and that

CUTTING TOOL	NOT COLORED	LIGHT STRAW	BROWN
H.S.STEEL	ACCEPTABLE		PR
NONFERROUS CAST			ACCEPTABLE
CARBIDE			
CERAMIC			

AS CUTTING SPEED INCREASES to about 300 sfpm, chip temperature goes up—then levels off. Color is a rough indicator of temperature and can be used as a guide to the best speed range. Chart suggests color (speed) ranges for four basic tool materials. Chips were obtained by cutting steel dry. Coolant will affect color.

Formula for Figuring Tool Life

1. *Find Factor K*, a constant that considers the tool and workpiece:

TOOL	WORKPIECE	CONSTANT K
HSS	Steel	7
HSS	Cast iron	6
Carbide	Steel	4
Carbide	Cast iron	3
Ceramic	Steel	1

(Say Factor K is 4)

2. *Find Factor A*, machine operating cost per minute: Per minute charges for the machine operator and machine overhead.
   (Say it is \$0.04 + \$0.08 = \$0.12)

3. *Find Factor B*, tool replacement cost. It involves:
   (a) Time machine is stopped for cutter change, multiplied by total per minute charge for that time (same as factor A, \$0.12 in this case).
   (Say it is 5 minutes × \$0.12 = \$0.60)
   (b) Time it takes to grind a cutting edge multiplied by the grinder's rate (and overhead).
   (Say it is 5 minutes × \$0.08 = \$0.40)
   (c) Tool depreciation. (Initial cost divided by number of cutting edges expected during tool's life.)
   (Say it is \$7 ÷ 8 = \$0.88)
   (d) Factor B = a + b + c = \$0.60 + \$0.40 + \$0.88 = \$1.88.

4. *Answer:* Optimum tool life equals

$$K \times \frac{B}{A} = 4 \times \frac{\$1.88}{\$0.12} = 62.7 \text{ minutes.}$$

means you can again boost speed. If you can slash the time it takes to change tools, or if you can reduce grinding costs, the replacement cost comes down.

Throwaways do both. Since the tips are simply unclamped and indexed to a new cutting edge, change time is cut as much as 80 per cent—and the new edge generally will be accurate to within 0.002 in. of the previous one. Grinding cost is eliminated. When the cutter is used on all its edges, it's discarded.

Throwaways account for roughly 15 per cent of the single-point tool jobs. A survey sponsored by Wesson Co., Detroit, determined that they soon will take up to 40 per cent of the jobs.

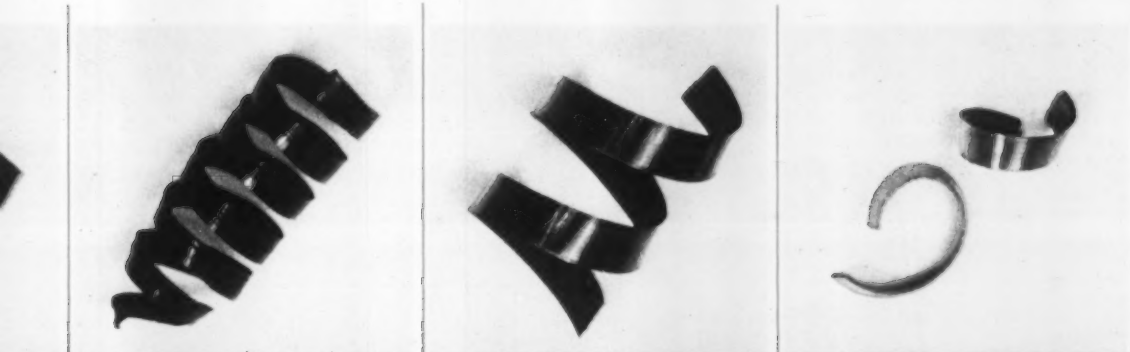
Example—Engineers at Convair, San Diego, Calif., say they get better performance at higher speeds and feeds with throwaways than they got with brazed tips. They now use them on all turning and facing operations for the F-102A jet and on 60 per cent of the face milling jobs.

These engineers also point out another gain. Since brazing is eliminated, there's no chance for braze strains to weaken the tips.

Example—At Convair, speeds went up. At Reliance Electric & Engineering Co., Cleveland, speed went unchanged. Gains were in cost cuts.

Two American Pacemaker profiling lathes turn motorshafts at Reliance. The shafts are 24 to 96 in. long. The lathes turn at an average of 400 sfpm; feed is 0.0166 in. a revolution; and depth of cut is up to ⅜-in.

CHIP COLORS—What They Tell



	PURPLE	BLUE	GRAY
REFERRED			
	PREFERRED		
	ACCEPTABLE	PREFERRED	
		ACCEPTABLE	PREFERRED

Source: Dr. William W. Gilbert, Machining Development Laboratory, GE

For 18 months, toolmen used carbide tips clamped to the shank. Tooling costs came to about $155.50 a month for each machine, including toolholders, inserts, regrinding of inserts and chipbreaker grinding.

Six months ago the job on both lathes was changed to triangular throwaways, which provide six cutting edges per tool. After the six are used, the tips are tossed out.

Records show that the replacement cost of an insert is less than the grinding cost on other types. Tool costs, now that grinding is eliminated, are averaging $51.35 a month per machine.

Multiple Approach—Although optimum speeds and throwaways can be used to pare costs, they are more effective when they're used together. GE started such a two-pronged program at its DC Motor & Generator Dept., Erie, Pa., at the beginning of the year. Under the direction of H. J. Brice, manufacturing engineering, it saved $75,000 in four months.

DESIGN

"Production cost levels are set in the engineering phase, and design can do more to influence profit and loss than any other single link in the product chain," is the opinion of R. D. Halverstadt, supervisor, metalworking laboratory at GE's Jet Engine Department in Cincinnati.

Your designers must know something about practical machining. Here are some of the things they should keep in mind. Once the functional requirements of a part are defined:

1. Specify the roughest possible surface finish. Tightening up on finish requirements may force production to add an operation.
2. Set dimensional tolerances no tighter than is required for the part function. Again, close tolerances may add a separate operation in the shop.
3. Avoid special threads and forms that require special tools.
4. See to it that the part has been adequately designed for holding, locating and handling.
5. Try to use most machinable grade when you select the material.
6. Dimension parts so they can be measured by production men.

   Avoid the imaginary points, work from part surfaces. Ask yourself: "Could I measure this on the part?"

Example — At Warner & Swasey, designers specified that a 2-in. radius had to be left at the end of milled flats on boring bars. This means the cutter had to have the special radius ground in and that the cut had to be lengthwise on the bar.

Designers and production men put their heads together and respecified, calling for a standard chamfer. The part, formerly machined with a special fly-cutter, now can be made with a standard face mill, and the cut can be taken across the bar—a much shorter distance. The simple revision saves more than $1100 a year.

MECHANIZE

The nonproductive part of the machine cycle kills many jobs, experts feel. The answer may be some degree of mechanization.

A Tip—Look to special attachments or equipment only after you've checked and found that there's no other way to get the gains.

Roger W. Bolz, editor, *Automation,* has this to say: "To be economical, automation in a production line must be based on the most efficient production techniques. This presumes that before you go to automatic systems, either simple or complex, you first run the job under optimum conditions, including speed, feed and tooling.

"There are at least two reasons for this: First, it is seldom economical to attempt to use automation as a substitute for inefficient cutting techniques. Second, optimum automation relies on optimum machining techniques."

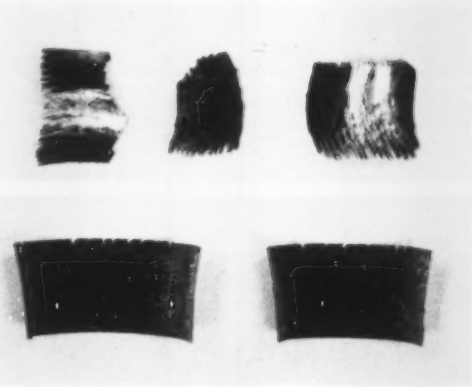
Next Step—Say you've got efficient machining and you think automation may be needed. Ask yourself these questions suggested by F. F. White, vice president-engineering, Automation Development Corp., Willoughby, O.

1. Is volume high enough to warrant automation? If not, can similar parts be grouped and run with a minimum tooling change?
2. Is direct labor a big factor? If so, automation may be the answer.
3. Is scrap a big factor? Since automation boosts consistency, rejects can be expected to decrease.
4. Are inspection costs high? It's usually simple to build 100 per cent inspection into an automatic line or machine.
5. Is the machine poorly utilized? Does it often wait for the operator to load, unload and adjust?

Suggestion—Look for chances to double up on operations—to eliminate handling between jobs altogether. Milled slots, for example, can be cut on an automatic screwmachine with an attachment. Several diameters can be ground at the same time by using multiple wheels. Both milling and drilling heads have been mounted on the rear of turret lathe cross slides.

Example—F. A. Miller, owner, Redford Lathe Turning Co., Detroit, says that when he bought a new Lodge & Shipley engine lathe, he had a tracer attachment added. Added versatility pays off on many jobs where the average run is less than ten parts. "On the right jobs, it's easy to save at least 50 per cent of the normal production time by using the tracer instead of hand-manipulating the machine."

Example — Engineers at Mission Mfg. Co., Houston, designed the firm's numerically-controlled line of six semistandard machine tools. It will turn out an average of 20 to 30 pump rods per run. They figure that with the new line, set up time will be cut 90 per cent.



DISCONTINUOUS CHIP

Top photo shows steel chips which are partially discontinuous because of nonuniform feed. Bottom photo shows cast iron chips, discontinuous because material is brittle. Proper speed and feed give more uniform tool pressure and better work finish. Normal practice: Reduce feed and take a deeper cut. Speed is critical; excessive speed produces a splinter chip

CHIPLESS MACHINING

When production men at Colson Corp., Elyria, O., went to tubing from bar stock on a rocket head closure, they saved $16 per 100 parts on material alone. In addition, they got rid of three husky drilling operations that had been holding up the job on a multi-spindle automatic.

The example illustrates one of the important trends taking over in production shops. Sometimes called chipless machining, it actually means that the cheapest machining is no machining.

This is particularly important when you're working with the tough-to-cut materials. The aircraft industry, for example, is trying hard to slash machining by using forgings, extrusions and castings that require little machining and by taking advantage of components like honeycomb panels. One aircraft spokesman has guessed that as much as 60 per cent of present airframe machining may be eliminated.

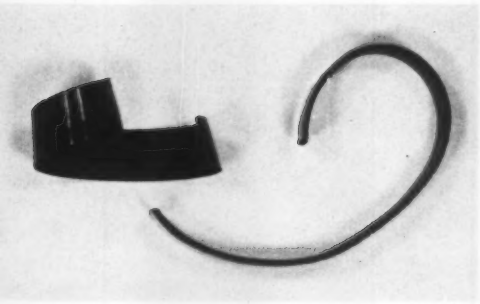
SUMMING UP

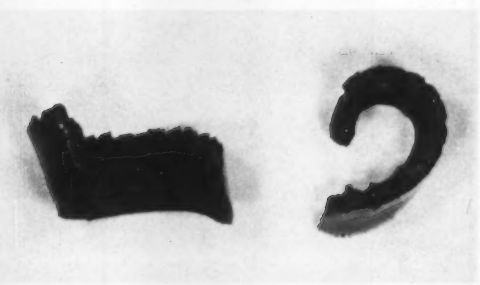
One, some or all of these approaches may help you add another degree of efficiency to your machining operations.

If you put them to work where they fit your jobs, you won't be like the farmer who told the agriculture department to stop sending booklets because "I'm not farming half as good as I know how to now."

What They Tell

Source: Monarch Machine Tool Co.





HEAVY DUTY CHIPS

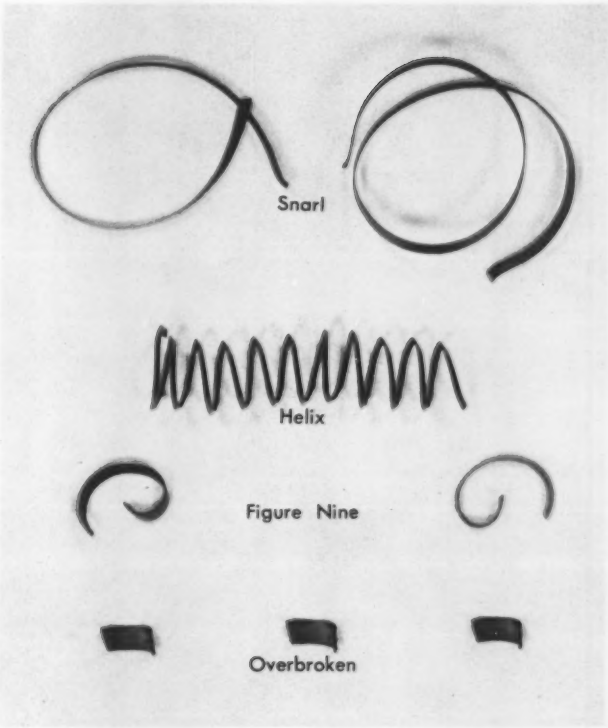
	Top Photo	Bottom Photo
TOOL MATERIAL	Carbide	HSS
SPEED (sfpm)	200	37
REMOVAL RATE (cu in./minute)	105	65
FEED (in. per revolution)	0.060	0.149
CUT DEPTH (inches)	0.750	1.000

When roughing large workpieces on heavy duty equipment, carbides produce good results at moderate speeds, with feed rates of 0.025 to 0.060 ipr and cuts up to 1 in. deep. Higher cutting speeds result in greater removal rates, less feed pressure and greater accuracy

CHATTER CHIP

SPEED (sfpm)	250
FEED (in. per revolution)	0.018
CUT DEPTH (inches)	0.250

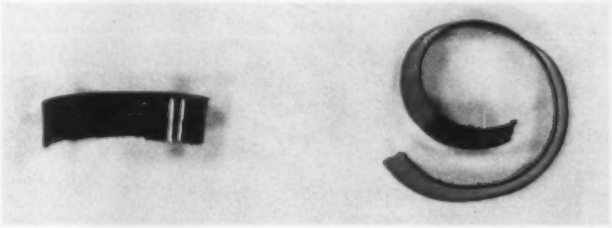
Here are faults that can cause these chips: Poor or obsolete equipment; excessive tool overhang; tool shank too small; nonuniform feed rate; variations in the material; overbroken chips; too much feed for cut depth; poor length to diameter ratio (need for steady rest); nonrigid setup; excessive cutting speed; dull tools; excessive negative rake on cutting tool



CHIP BREAKING

SPEED (sfpm)	400
FEED (in. per revolution)	0.010
CUT DEPTH (inches)	0.150

TYPE OF CHIP	BREAKER WIDTH (in.)	COMMENT
Snarl	0.125	Breaker too wide.
Helix	(Crater)	Normally due to worn tool.
Figure Nine	0.093	Correct chip control.
Overbroken	0.057	Breaker too narrow.



PERFECT CHIP

SPEED (sfpm)	550
FEED (in. per revolution)	0.018
CUT DEPTH (inches)	0.250

When machining steel, a continuous figure nine chip is considered ideal. Control ratio of feed to cut depth. Feed should be lowered and speed increased as the depth of cut is reduced

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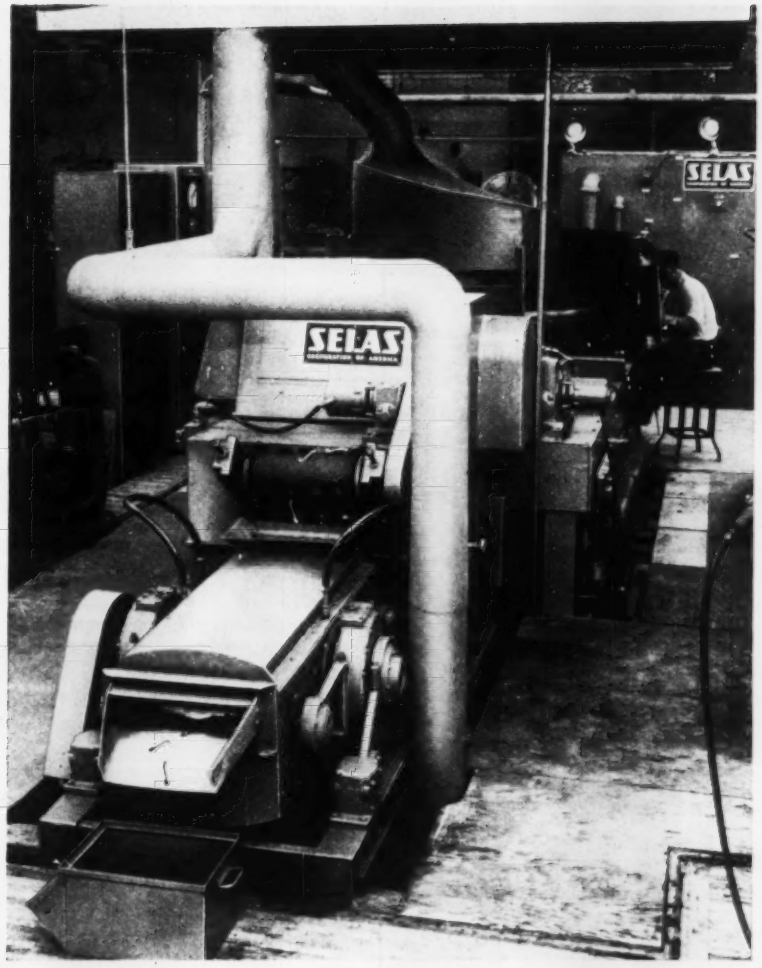

Heat treated, washed, and dried bars emerge from IBM's austempering unit and fall into a tote box. Temperature and motor controls are in cubicle in left background; combustion controls are in cubicle in right background

Austempering Is Mechanized

An automatic machine at IBM heats, quenches, washes, and dries typewriter parts automatically. Installed in the production area, it simplifies work handling

By R. S. McFALL
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Machinery & Process Div.
International Business Machines Corp.
Kingston, N. Y.
and
C. A. McFADDEN
Manager
General Industry Div.
Selas Corp. of America
Dresher, Pa.

INTERNATIONAL Business Machines Corp., Kingston, N. Y., has replaced its twin-bath austempering setup for electric typewriter type bars with an integrated, gas-fired machine.

Built by Selas Corp. of America, Dresher, Pa., the automatic unit has reduced manpower requirements 40 per cent, practically eliminated scrap, and cut nonproductive downtime.

Installed in the metalworking area close to the press that stamps out the workpiece, the machine forms a logical segment in the work flow. The handling of parts is simplified.

The Workpiece—The high operating speed of a type bar (the type face is soldered on it) calls for a hard, tough structure (Rc 42-44) and a flat shank (±0.001 in.).

The bar is about 4⅝ in. long, 9/32 in. wide, and 0.040 in. thick. It is stamped from AISI 1040 steel and bent at one end. All the bars in a typewriter form a segment of a circle when they are at rest, and each must strike the paper vertically. So the bars are press formed to a different angle for each character. At least 42 such shapes are required for each IBM electric typewriter.

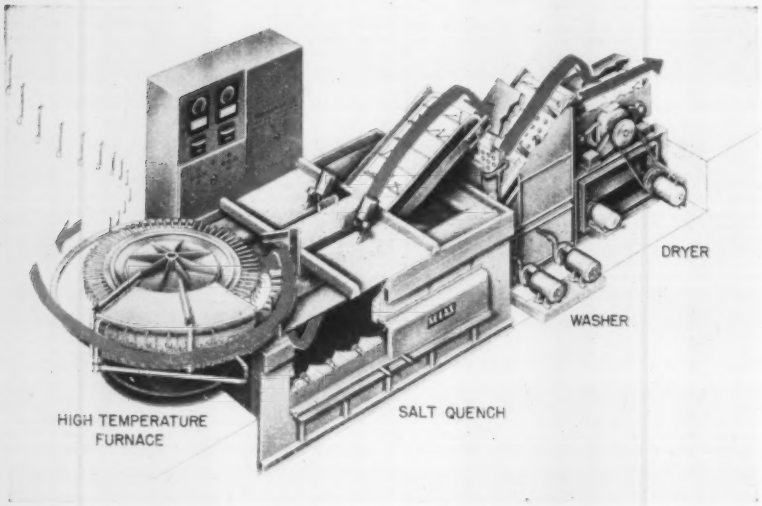
Required hardness and flatness are developed by heating the parts for hardening and quenching them in an elevated temperature bath to permit an isothermal transformation (austempering) to take place.

Former Operation — The bars used to be treated at about the same production rate in two salt bath furnaces—one for high temperature austenitizing and the second for isothermal quench. That equipment required five operators, involved considerable maintenance time, expensive fixture replacement, and large quantities of salt, plus other supplies.

When IBM moved its typewriter manufacturing operation to the Kingston plant, the austempering operation was selected for mechanization.

IBM production engineers and Selas process development men resolved the process into a basic time-temperature cycle. The curve was used to design a machine with a high temperature gas furnace, mechanized salt bath quench, and high speed wash and dry sections.

Heating Unit — The bars are



Drawing of integrated heat processing machine shows work flow and various units of the machine that produce austempered bars for electric typewriters

AUSTEMPERING . . .

loaded manually onto the chrome-nickel alloy fixtures of the high heat conveyer, which is a horizontal pinwheel that carries them past the burners in the high temperature furnace.

The furnace section is circular. A bar traveling through it is heated to 1550° F in 25 seconds. After being released from the fixture, it drops through a tube in the floor of the furnace and into the salt bath.

Burners—The furnace is fired by Duradiant burners set in the outer refractory wall. Each burner is a ceramic cup in which a controlled mixture of natural gas and air is burned. The flame wipes the cup, bringing it to incandescence, resulting in high intensity radiation of heat to the workpiece.

There is no flame impingement on the workpiece although burners fire directly at the bars at a distance of only 4 in. Burners are in horizontal rows in a pattern engineered to produce a uniform temperature throughout the bar by the time it is released for quenching.

Operating Advantages — The principle of furnace construction and operation (it's known as Gradiation) offers several advantages. Three factors in combination protect the surface of the workpiece:

1. Controlled combustion of a rich gas-air mixture produces a slightly reducing atmosphere. 2. Tight furnace construction and positive furnace pressure prevent infiltration of excess air. 3. Total workpiece exposure to the heat is measured in seconds.

Quenching — The salt quench furnace into which the bar is dropped after reaching 1550° F is the largest component of the austempering line.

The bath is contained in a welded steel pot. It is enclosed to prevent dangerous splash of hot salt and to minimize heat loss. Two rows of Duradiant burners firing at close range, one row on either side of the pot, supply the heat. Twin propeller-type agitators keep the temperature uniform within 2° F throughout the bath.

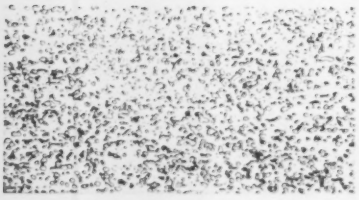
The bar is held in the salt bath for 15 minutes and about 10 additional minutes on the salt quench conveyer. After it falls through a recirculating water spray, which cleans off the dried salt, it is carried up a belt conveyer and deposited in a circulating warm air dryer. The air is heated by a spark ignited, direct flame gas burner.

Metallurgy—The bars as received have a thoroughly spheroidized structure. After treatment, microexamination reveals a tough, fine-grained Bainite.

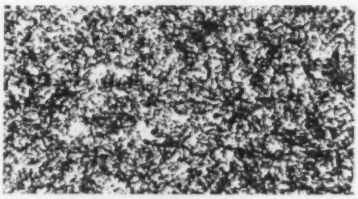
Other Plusses—IBM has moved austempering from a separate heat treat room to the production area, greatly reducing the amount of work handling required.

The machine is operated by three men instead of the five that were required. Dragout of molten salt is reduced, and a possible personnel hazard (periodic removal of sludge from the hot salt) has been eliminated. Downtime has been cut. The reject rate is lower, and scrap has been practically eliminated.

IBM has been operating the machine for about a year. A similar unit for heat treating cam levers is under construction.



As-Received



Austempered

This stamped bar requires austempering to produce the hardness and toughness necessary for long life and reliable service. At top are photomicrographs (X500) of bars before and after austempering

US RUBBER PERMOBOND LININGS

How to prevent salty drinkers from getting "ulcers"

The modern Linden, N. J., plant of General Aniline & Film Corporation produces, each day, many tons of chlorine and caustic. The 4 brine inlet filters and brine storage tanks (pictured above) and miscellaneous brine-handling equipment—plus the plant's 52 electrolyzers, all are lined with U. S. Permobond® protective rubber especially developed and compounded for resistance to chlorine and caustic solutions. *Without this Permobond protection, the corrosive solutions would attack and destroy the metal.*

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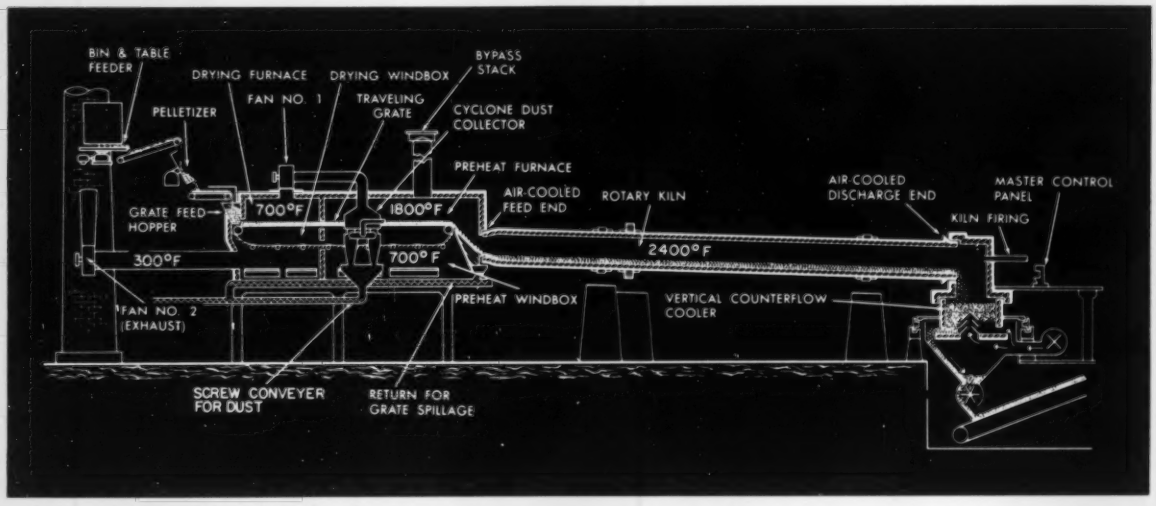


Schematic cross section of the Allis-Chalmers process for heat treating taconite (magnetite) concentrates. Over-all length of a 3000 ton a day plant would be about 300 ft

Furnace Makes Strong Ore Pellets

Combination grate and kiln design makes for efficient use of hot gases. Taconite pellets burned in the new furnace withstand rough handling

BETWEEN the beneficiation plant and blast furnace bell, losses in ore fines are a great frontier for cutting costs. One approach is to cut down the times an ore product (lump, sinter, pellet) is handled. Another is to make the product stronger.

Allis-Chalmers Mfg. Co., Milwaukee, has just announced a process for making strong taconite pellets. Pelletizing methods are conventional, but a flat grate furnace and a rotary kiln are used for hardening. Conservation of heat and cleanliness are said to be additional advantages of this process.

Pilot Plant—Steel industry and mining representatives have been studying the pilot plant at Allis-Chalmers' Carrollville, Wis., laboratory. The operation has four steps:

1. Forming pellets in either a balling pan or drum.
2. Drying pellets on a moving grate.
3. Heating (partially oxidizing) pellets on a moving grate.
4. Burning pellets in a short rotary kiln.

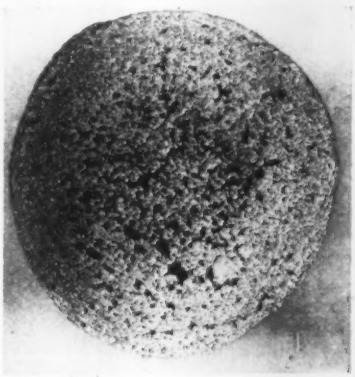
When steps No. 2, 3, and 4 are performed, the furnaces are an integrated unit.

Procedure—The process begins with the forming of ½ to ¾ in. pellets from finely ground moist magnetite (taconite) concentrates. A conveyer deposits the pellets in a hopper which feeds a traveling grate.

The grate carries the pellets into a drying chamber where they are subjected to a downdraft of hot gases at 600 to 800° F. They are the offgases from the preheat chamber, into which the pellets move from the drying chamber at a steady rate on the endless belt grate.

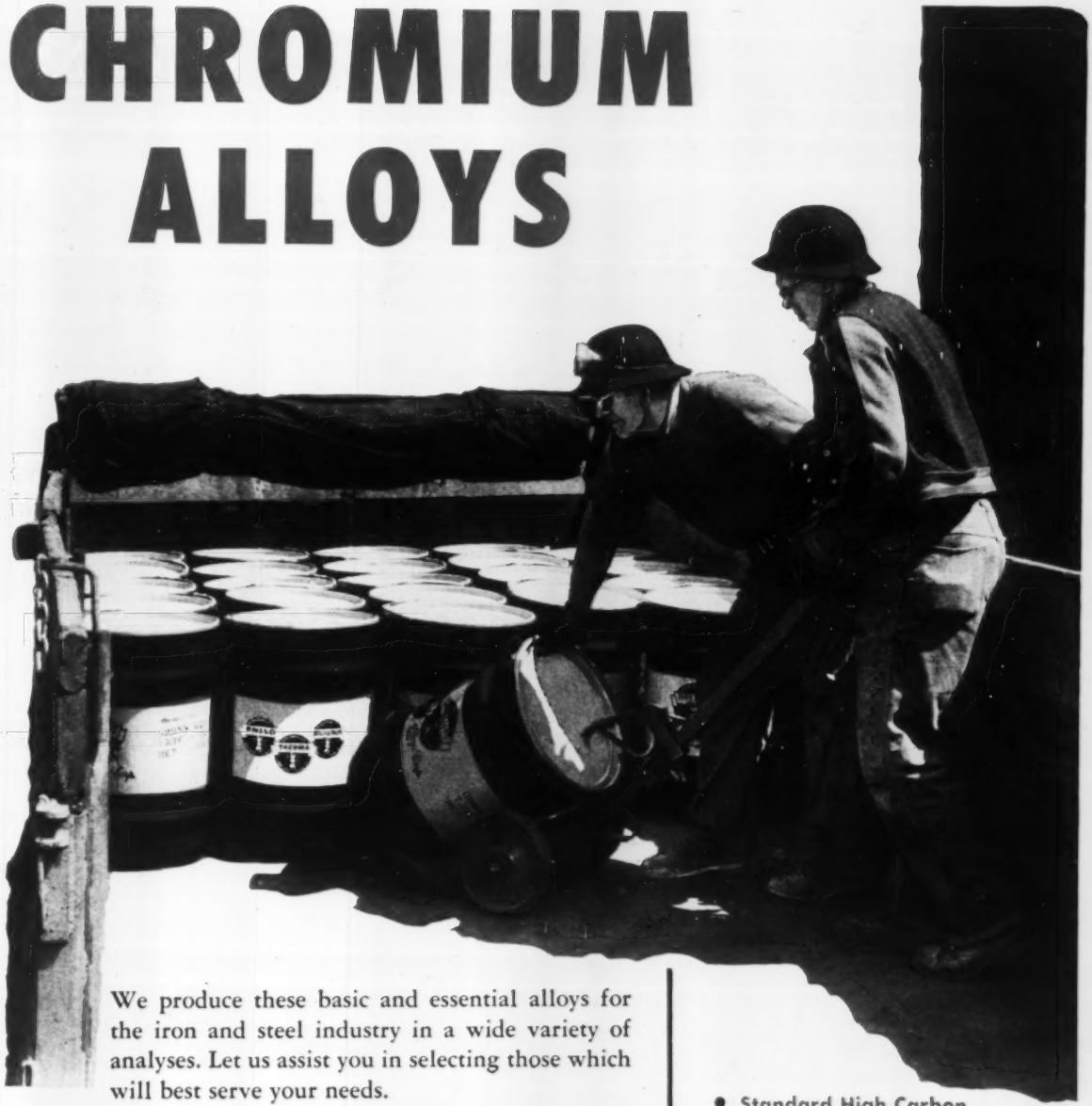
In the preheat chamber, they pass through a downdraft of highly oxidizing gases at 1850 to 1950° F. The gases enter the chamber from the mouth of the rotary kiln, which abuts the end of the preheat furnace.

Fusion—During oxidation, individual grains of transformed hematite bridge together by grain



Enlarged cross section of the completely oxidized pellet. The porous structure aids in the reduction to pure iron when the pellets are smelted in the blast furnace

CHROMIUM ALLOYS



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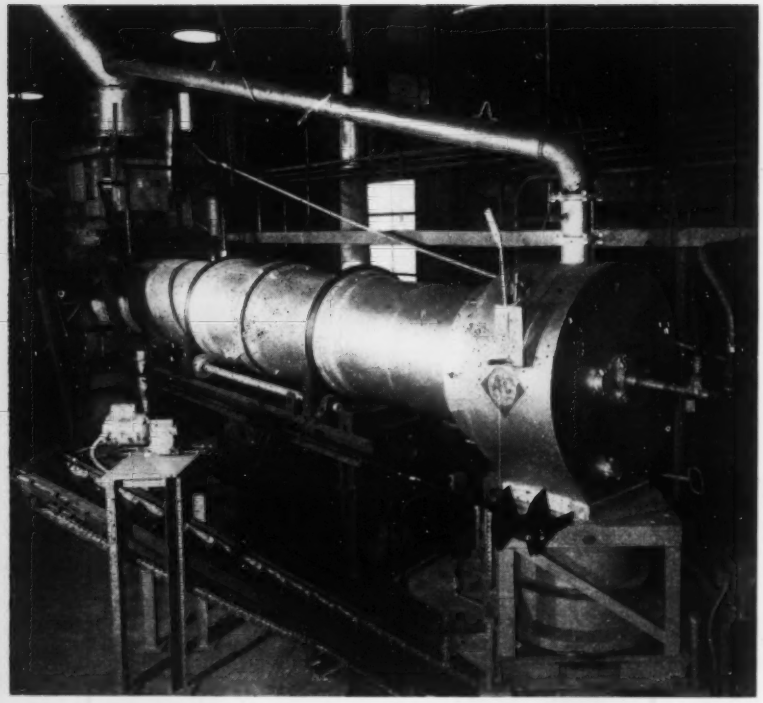

Pilot plant built by Allis-Chalmers at its Carrollville, Wis., laboratory where workability of the process has been demonstrated. Photo shows the exit end of the kiln

PROGRESS . . .

growth and recrystallization. This transformation from magnetite to hematite ($4\,Fe_3O_4 + O_2 \rightarrow 6\,Fe_2O_3$) develops great enough crushing strength (100 to 200 psi) to withstand the tumbling action of the kiln into which the pellets pass on leaving the preheat chamber. Although their internal structure changes, pellets do not fuse with each other because of insufficient surface contact.

In the kiln, gases between 2350 and 2450° F complete the development of the network of hematite crystals within each pellet. After passing through the kiln, they drop into a vertical counterflow cooler which recovers most of the sensible heat from them. Any dust the cooling air picks up from the pellets is carried through the kiln and stripped out of the air as it passes downward through the preheat and drying furnace grates.

Savings—Fuel economy is an outstanding feature. Largely, it is the result of efficient re-use of exhaust gases from one stage of the process to support reactions in others. Gases exhausted to atmosphere have a temperature of only 250 to 350° F. This arrangement keeps fuel consumption down to about 750,000 Btu per net ton. Any conventional solid, liquid, or gas fuel can be used.

Operating and maintenance costs of a production unit are expected to be low. Most of the dust and fines are retained within the system, where they are incorporated into finished pellets. Production rates obtained in the pilot plant range from 2.75 to 3 net tons of product per square foot of grate area per day.

The pellets have been tested in a standard ASTM, two-lifter bar drum for 200 revolutions. They show little breakage but do produce from 1 to 5 per cent fines from surface abrasion (considered to be excellent performance). It indicates that a full scale plant should produce a product that will withstand the abuse of handling and shipping.

Handles Hot Sand

This conveyer belt will take temperatures up to 350° F, last longer, says maker

A MALLEABLE iron foundry (I-F Mfg. Co., New Philadelphia, Ohio) needed a conveyer belt that could handle the sand from its hot shakeout.

The solution: A 4-ply belt of synthetic rubber. Called Solarflex by the maker (B. F. Goodrich Industrial Products Co., Akron), it carries hot sand 24 hours a day, five days a week: There has been no shutdown in more than 18 months. Curtis Pollock, general plant superintendent, says that the belts will last several years.

Costly Maintenance — The belt in the illustration carries 300° F sand from the shakeout. It dumps it onto another belt which carries it to a simplicity screen. Sifted material is carried by bucket conveyers to storage bins.

Old style belts had to be replaced every three months. Loss of production and maintenance time were exceptionally high.

HOT SAND
. . . doesn't hurt this belt

Durable — Solarflex belts resist heat. The rubber remains pliable and elastic when exposed for long periods to materials as hot as 350° F, say Goodrich officials.

An outstanding feature of the belt is its construction which gets more efficient service from mechanical belt splices. In average belts, fasteners tear out as the belt carcass hardens and cracks from heat. They don't tear away from Solarflex belts because the carcass remains flexible.

MACHINING PERFECTION always starts with the right steel

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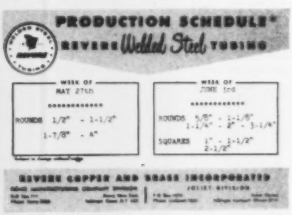
3 Wall thicknesses range from *.028" to .250"* and *.065" to .250"* depending upon the size and grade tube . . . C-1010 to C-1030 steels are available . . . coated or low alloy — high strength steels may also be specified.

4 *Complete facilities* for annealing, normalizing, sink or mandrel drawing and hydrotesting. . . . Do you have a special fabrication requirement?

All of these features are backed by REVERE'S more than *35 years' experience* in producing electric welded steel tubing for every type application. *Try REVERE next time! You'll be glad you did!*

KEEP YOUR PRODUCTION ON SCHEDULE—KEEP IN TOUCH WITH REVERE



Shown at left is a sample of the card mailed every two weeks, in advance, showing Revere's Production Schedule. Our customers have found it to be extremely helpful. Shall we place your name on the list? No obligation, of course, and you need not be a Revere customer.

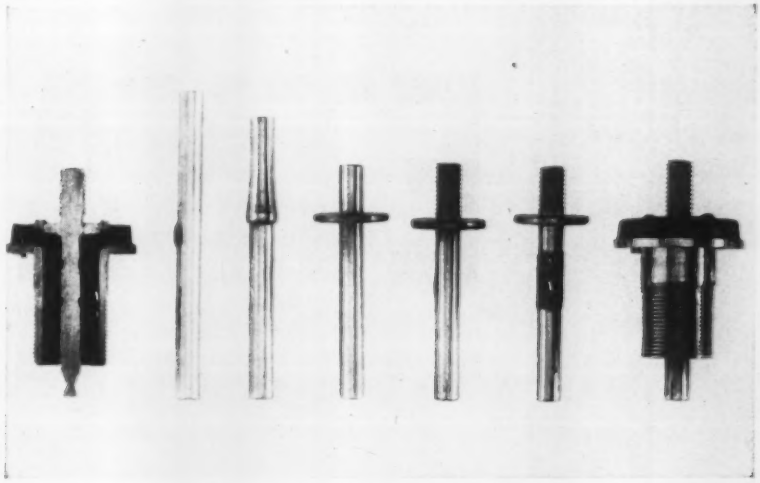
Send today for these two informative booklets: 1 — Revere Welded Steel Tubing Catalog. 2 — Commercial Tolerances for Welded Steel Tubing.

WELDED STEEL 18 01 REVERE TUBING

REVERE COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
Rome Manufacturing Company Division
Box 111 Rome, N. Y.

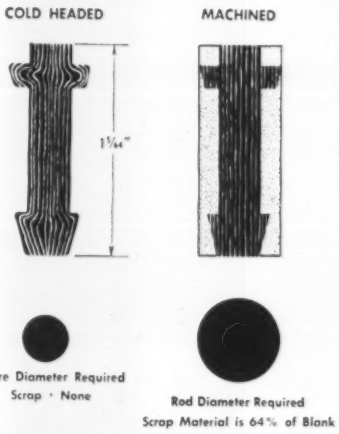
This metal and its alloys are being cold headed into many new shapes. The potential is almost unlimited when it is used with secondary operations like slotting, drilling, tapping

By THEODORE B. SMITH
President, John Hassal Inc.



The center piece of this electrical component is cold headed instead of being machined. Result: Savings of raw material and time

Cold Heading Copper for Economy



Cold heading offers the advantage of added strength resulting from a gradual flow of the grain structure. Notice the material saved

THOUSANDS of standard and odd shaped fasteners and machine parts are being produced by cold heading copper and its alloys.

The ductile alloys are easier to work than most metals. They offer: Substantial dollar savings, improved design, and increased strength.

Example—The center element of the cutaway part shown above was originally produced on a screw machine. A copper alloy rod with the outside diameter of the collar was turned down to the desired shape. The method required a substantial amount of machine time and resulted in a considerable amount of scrap (see at left).

Using cold heading, the wire stock is given a coning punch and headed to produce the collar. Then the part goes to two machines for threading and knurling, and, finally, a slot is cut at one end.

Cold heading the collar eliminated cutting an unusual contour that was formerly necessary to insure that the part was securely impressed in the compound surrounding it.

Advantages — To realize the benefits of cold heading, at least 5000 parts should be made. A high production rate is necessary to overcome the costs of making the dies and setting up.

Economy: Since the operation is entirely automatic, high volume is obtained in a short time. Manual labor is used only in setup and removing finished parts.

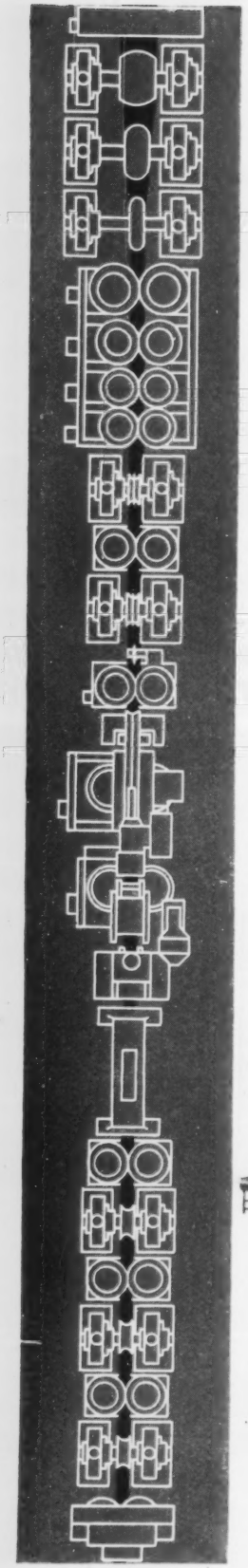
No Scrap: Compared with machining, the process produces virtually no scrap; no scale is formed, as in the case of hot forging.

Physical Advantages: Since the flow line of the metal's grain follows the contour of the section, there is an increase in the fatigue and shock resistance of the finished part. The tensile strength of some materials is increased by cold working.

Surface Finish: The smooth, compressed and toughened surfaces produced by drawing raw metal into wire are retained; excellent surface finishes result.

Design Factors: Cold heading gives close dimensional tolerances, smooth rounded corners and built-in fillets. No burrs are produced.

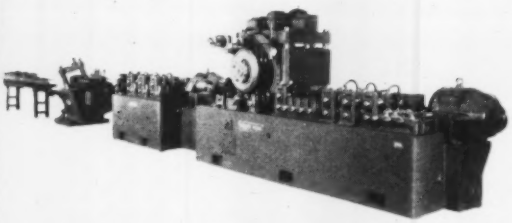
Selection of Materials — The quality of cold headed parts is maintained by carefully selecting only wire types which are ductile



ETNA TUBE MILLS

feature a Universal Drive that has the advantages of (1) adaptability to roll methods; (2) adjustable lower spindle; (3) fast change-over, and (4) completely sealed gearing.

FOR WELDED TUBE AND PIPE OF STEEL, COPPER, ALUMINUM, STAINLESS STEEL. Sizes from 5/16 OD - .022 wall to 16 OD - .500 wall.



SWAGING MACHINES • TUBE CUT-OFF MACHINES • ALLIED EQUIPMENT

Abbey ETNA COMPANY

811 E. INDIANA AVENUE • PERRYSBURG, OHIO

COLD HEADING COPPER . . .

and highly resistant to cracking.

The wire should be free of scratches, seams, blisters and other imperfections. If a high quality wire is not used, cracks and breaks develop on the surface where the original material has been upset to a larger diameter.

The material must be malleable so that it will fill out the die without developing dangerous shearing stresses. It also must be of the correct temper so that the finished product will have the desired physical characteristics.

This checklist will help you in your selection of the correct copper alloy to use:

High Brass—The most popular of the heading wire alloys, it has a special temper and surface, is ductile and malleable.

70-30 Brass—It is slightly more ductile than high brass.

Low Brass—A highly malleable alloy, this type is more resistant to general corrosion than high brass.

Red Brass—Used for ornamental jewelry, this brass has a rich golden color.

Commercial Brass—Since it resists stress-corrosion cracking, this alloy is recommended for outdoor construction.

Light Leaded Brass—These alloys are used for operations requiring good cold heading with light machining.

Duronze V—This type is immune to stress corrosion cracking and is highly malleable.

Phono-Electric—This alloy has an electric conductivity which is 40 per cent that of pure copper and is stronger than copper.

How Process Works

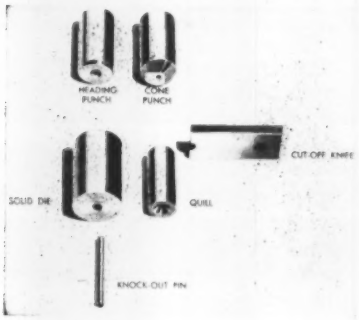
Metal is deformed beyond its elastic limit and takes a permanent set in the desired shape. Sections of wire or rod stock are sheared to length and formed cold by flowing between dies.

The stock is fed through straighteners and feed rolls into the cold heading machine where it comes to rest against a stop.

There are two types of machines, the solid die and the open die.

Solid Die Forming — The body die is a steel cylinder having an axial hole through it. Cutoff knives

COLD HEADING COPPER . . .

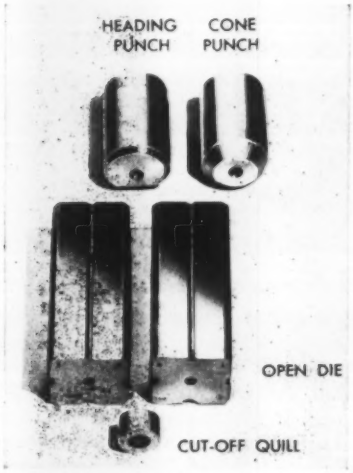


The components of a solid die used in a cold heading machine

shear the wire against a quill and carry the blank to a position directly over the hole in the die.

The heading punch moves forward and pushes the blank into the die until it is stopped by a knockout pin. The forward motion of the heading punch continues and forms the head to the desired shape in the punch, in the body die or in a combination of both.

Open Die Forming—Two identical square ended steel blocks are used. Semicircular grooves along the sides of the two blocks form the body die when faced together.



In an open die, the wire is gripped in the grooves by closing the gap between these die blocks

Wire feeds into the opening between the die faces, is gripped between the blocks, sheared and formed.

The blocks may open just wide enough for the wire to be pushed through by the section following

No matter what shape your pump housings take . . .

SOUND THE CALL FOR **NBD BRONZE**

Any shape! Any weight up to 20,000 lbs. As-cast, semi-machined or finish-machined.

That's what we offer when you call for pump housings, bushings, impellers . . . of NBD Bronze. Many leading manufacturers like the combination . . . find cost-saving benefits in our more than 40 specially-developed bronze alloys and knowledge of casting techniques.

We're fully equipped to handle your largest requirements, as well as smaller production-run sizes. Shell mold, cast-to-size, centrifugal casting are also right down our alley.

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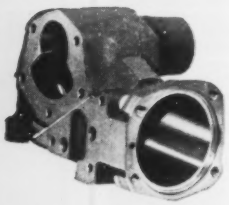
Why MICROHONING

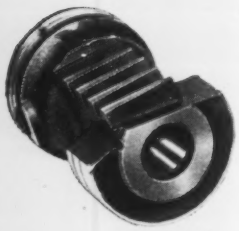
Is Final Stock Removal Process For Interrupted and Blind-End Bores

To secure low-cost, final stock removal, that generates accuracy and functional surface characteristics in a variety of bore conditions, a leading manufacturer of power steering assemblies uses Microhoning. Here are details concerning types of bores and stock removal results obtained by using Micromatic "Know How"—



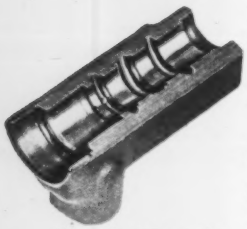
STEERING GEAR HOUSING—Microhoning consistently corrects cumulative inaccuracies of preceding operations—reduces scrap—permits faster boring—cuts boring tool sharpenings—lowers down-time and tool costs.

Material: Soft Malleable Iron
Bore: 3.125"D x 6.93"L (Ported bore with ¼" relief at blind end)
Stock Removal: .002"
Finish: 50 Microinches RMS
Microhoning Cycle: 18 sec.
Preceding Operation: Boring



PISTON RACK—Microhoning answers the need for a final stock removal process that generates a controlled surface finish in the bore of this leaded steel part. Microhoned surface (cross hatch) prevents oil leakage and holds to a minimum the wear of seal that operates in the bore.

Material: Leaded Steel (Rockwell 62 "C")
Bore: .875"D x 3"L
Stock Removal: .005"
Finish: 20 Microinches RMS
Microhoning Cycle: 20 sec.
Preceding Operation: Boring and H.T.



VALVE HOUSING—Microhoning consistently holds size and geometric accuracy—meets stringent surface requirements—assures alignment of four lands in bore. Thus, there is no leakage of oil around control valve which is selectively fitted to its housing.

Material: Cast Iron
Bore: .770"D x 2.18"L (Interrupted)
Stock Removal: .0025"
Tolerances: Size .0005"
Roundness .0001"
Straightness .0001"
Finish: 10 Microinches RMS
Microhoning Cycle: 12 sec.
Preceding Operation: Boring

The principles and application of Microhoning are explained in a 30-minute, 16mm. sound movie, "Progress in Precision" . . . available at your request.

☐ Please send me "Progress in Precision" in time for showing on _____(date).
☐ Please have a Micromatic Field Engineer call.
☐ Please send Microhoning literature and case histories.

PRECISION PRODUCTION THROUGH MICROHONING — MICRO MATIC

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TITLE _____
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CITY _____ ZONE _____ STATE _____

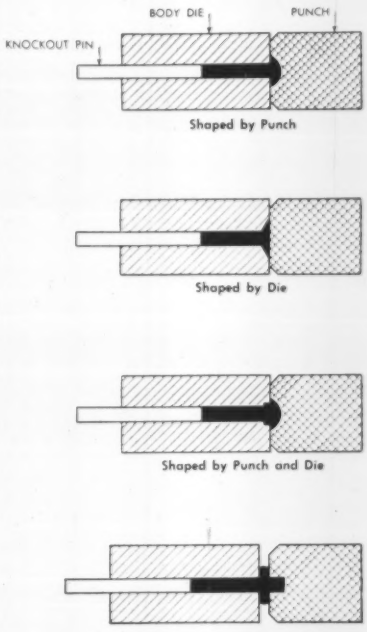
MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN

COLD HEADING COPPER . . .

or they may open sufficiently wide for the part to fall through.

The upset can be formed in the cavity of the punch, in the body die, in the cavities of both, or between the dies. Up to 400 parts a minute can be made.

Open dies are used for forming long parts and where the wire blanks are of small diameter (less than 1/16-in.) since the knockout pin of the solid die would be so thin that it would not hold the blank during heading.



Four methods of cold heading

Multiple Blows—Many parts are made in several blows. The first gather the metal into a conical upset and the last continues this graduated flow into the final shape.

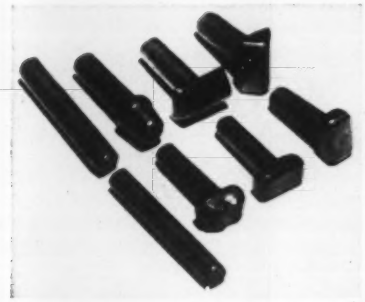
Two or more are used to assure that the wire upsets uniformly.

In applying multiple blows, the blank may be held in the original body die for all blows, or it may be transferred to one or more other dies for subsequent blows (progressive heading).

Supporting Operations — Other closely related operations are often required. Many fasteners and parts are first cold headed, then trimmed to shape.

Extrusion can be done on a cold heading machine. The stock is simply forced into a die smaller

COLD HEADING COPPER . . .



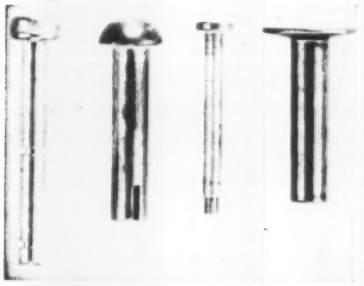
These machine screws were made in two blows. The metal was first gathered into a conical upset, which the second blow formed into the final shape. Threading completes the production of the screw

than the original diameter.

Roll threading is also done by cold heading manufacturers. Headed blanks are rotated under pressure between hardened steel dies.

The threads of the dies upset the surface of the blank as it rolls between them, displacing material to form the roots of the threads and forcing the displaced material radially outward to form the crests.

Closer dimensional fits can be obtained, and the threads themselves are about 13 per cent stronger due to the cold working.



Cold headed copper parts which have received secondary operations

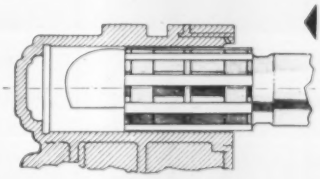
Future Uses—The potential of cold heading is almost unlimited when it is used with secondary operations such as slotting, drilling, tapping, threading, swaging, milling, fluting, grinding, knurling, and trimming.

A designer who can visualize the production of parts by combining cold heading with such secondary operations will lower production costs, improve performance and quality.

How MICROHONING

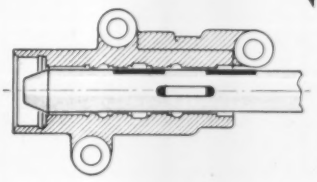
Cuts Costs—Generates Accuracy—Speeds Production of Interrupted, Blind-End Bores

Shown are two Microhoning machines that are used in the plant of a leading manufacturer of automotive power steering assemblies. Machines are equipped with automatic stone feed and stonewear compensating mechanisms, and automatic sizing controls. A two-position rotary fixture is interlocked with machine controls for fully automatic index cycle. The following applications tell more of the "how".



STEERING GEAR HOUSING—In Microhoning the ported, blind-end bore of steering gear housing a nine-stone tool is used. At least six of nine stones are in contact with bore surface when tool passes over irregularly shaped port. Removing .002" of stock from 3.125"D x 6.93"L bore in 18 seconds, Microhoning generates final accuracies and a controlled finish of 50 microinches as specified.

PISTON RACK—In 20 seconds, Microhoning removes .005" of stock from .875"D x 3"L open end leaded steel bore of piston rack. Self-sharpening abrasives assure a consistent generation of specified surface finish of 20 microinches.



VALVE HOUSING—Microhoning tool used for final stock removal in bore of valve housing has one bank of stones and two banks of plastic guides—three stones or guides in each bank. Guides act as tool pilots and stabilizers in interrupted bore—prevent overcutting at edges of lands—assure straight bore by keeping tool aligned. Self-dressing abrasives consistently generate geometric accuracy of .0001" and surface finish of 10 microinches.

Microhoning economically removes stock—corrects cumulative inaccuracies of preceding operations—reduces scrap—permits faster boring—lowers machine tool downtime and maintenance to cut costs and speed production.

Send Coupon for Complete Information

Learn how Microhoning will give efficient stock removal, closer tolerances, accurate alignment and functional surfaces.

☐ Please have a Micromatic Field Engineer call.
☐ Please send Micromatic literature and case histories.

NAME _____ G

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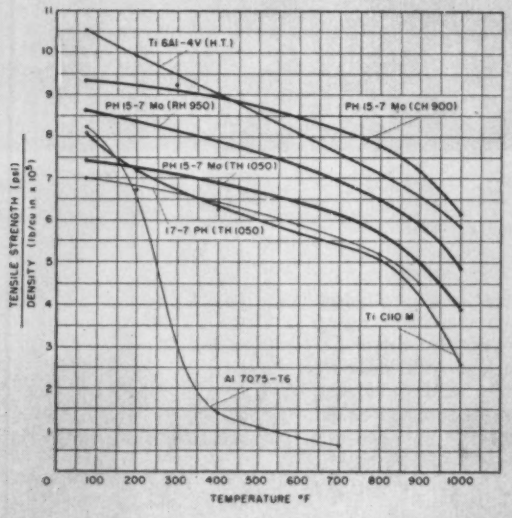
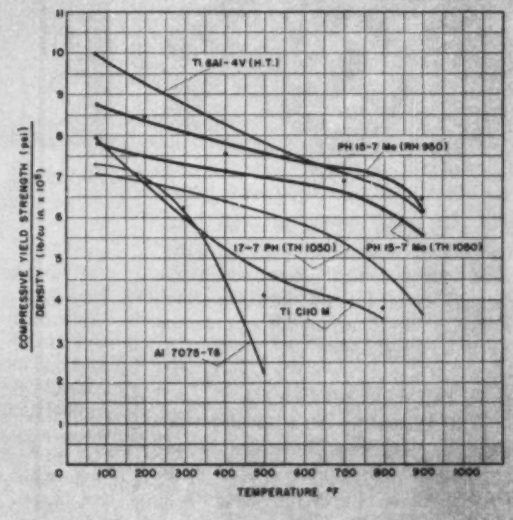
Strength-Weight Comparisons of High Temperature Alloys


Ti 6Al-4V (H.T.)
PH 15-7 Mo (RH 950)
PH 15-7 Mo (CH 900)
PH 15-7 Mo (TH 1050)
17-7 PH (TH 1050)
Ti CHO M
Al 7075-T6
TENSILE STRENGTH (psi) / DENSITY (lb/cu in. x 10³)
TEMPERATURE °F


Ti 6Al-4V (H.T.)
PH 15-7 Mo (RH 950)
17-7 PH (TH 1050)
PH 15-7 Mo (TH 1050)
Ti CHO M
Al 7075-T6
COMPRESSIVE YIELD STRENGTH (psi) / DENSITY (lb/cu in. x 10³)
TEMPERATURE °F

New Steel for Hot Aircraft

Armco's PH 15-7 Mo steel can be used up to 1000° F, is readily available, and is easiest of high strength alloys to form

THE SEARCH for a precipitation hardening stainless with higher strength-temperature properties has uncovered a new alloy. It's designed for skins and structural parts of aircraft and missiles flying four times the speed of sound (about 2700 mph). At that speed, temperatures may reach 1000° F.

Developed by Armco Steel Corp., Middletown, Ohio, the steel, called PH 15-7 Mo, costs one-tenth that of high strength titanium alloys. It offers the ease of fabrication and corrosion resistance of 17-7 PH.

Composition—It contains 15 per cent chromium and 7 per cent nickel. High strength properties come from a strong precipitation hardening reaction fostered by 1.2 per cent aluminum.

About 2.5 per cent molybdenum is used in the composition to get good retention of the high strength properties up to 1000° F.

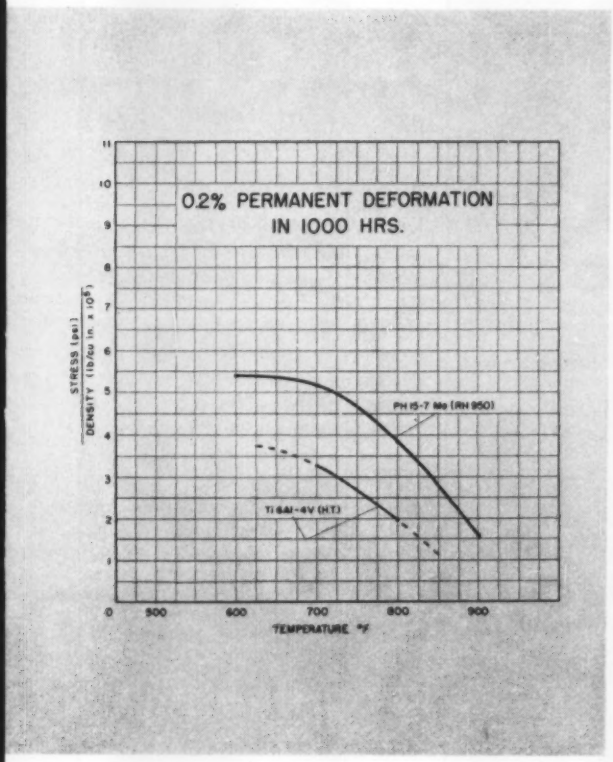
Carbon is controlled below 0.09 per cent. It permits the steel to be welded without the preheating or postannealing treatments that are necessary to minimize cracking when welding high strength martensitic carbon and stainless steels.

Formability—In the annealed condition, the steel has a predominantly austenitic grain structure, which makes it easier to form than other high strength materials, says Armco.

The steel does not temper or deteriorate in room temperature strength after exposure for long periods at 400 to 900° F. A slight increase in room temperature strength has been measured after it has been stressed above operating limits for 1000 hours at 800° F.

Hardening — Procedures for hardening may be varied to suit different production situations. When severe cold forming is necessary, Condition A (annealed) is used. If only mild forming is required, Condition C (hard, cold rolled) sheets and strip may be used to provide high strength with a simple 900° F heat treatment.

In either case, a partially hardened or transformed state must exist before precipitation hardening. The sequence of operations in fabricating and heat treating sheets and strip is shown on the opposite page.



Properties of PH 15-7 Mo Sheets During Fabricating and Hardening

ANNEALED

(CONDITION A)	Ult ten str	130,000 psi
	0.2% yld str	55,000 psi
	% Elong	30

Severe Forming Operations

Transform by Heat Treatment*

Heat at 1400° F for 1½ hr and cool to 60° F within 1 hr. Hold at 60° F for minimum of 30 min. Condition T.	Ult ten str	145,000 psi
	0.2% yld str	95,000 psi
	% Elong	7

Precipitation Harden**

Heat at 1050° F for 1½ hr and air cool. Condition TH1050.	Ult ten str	210,000 psi
	0.2% yld str	200,000 psi
	% Elong	7

Alternate Heat Treatment*

Heat at 1750° F for 10 min and cool in air. Refrigerate for 8 hr at −100° F. Condition R-100.	Ult ten str	180,000 psi
	0.2% yld str	125,000 psi
	% Elong	7

Precipitation Harden**

Heat at 950° F for 1 hr and air cool. Condition RH950.	Ult ten str	240,000 psi
	0.2% yld str	215,000 psi
	% Elong	6

HARD ROLLED

(CONDITION C)	Ult ten str	220,000 psi
	0.2% yld str	190,000 psi
	% Elong	5

Mild Forming Operations

Already Transformed by Cold Work

Precipitation Harden**

Heat at 900° F for 1 hr and air cool. Condition CH900.	Ult ten str	265,000 psi
	0.2% yld str	260,000 psi
	% Elong	2

*A maximum expansion of 0.5% occurs with the change in phase.
**A contraction of about 0.04% results during precipitation hardening.

together with typical room temperature properties.

High Temp Strength—A combination of the composition and the RH950 heat treatment produces a 25 per cent increase in tensile strength at 600° F over that of 17-7 PH steel in Condition TH1050.

Measurement of tensile stresses required to produce 0.2 per cent permanent deformation in 1000 hours at 800° F shows that PH 15-7 Mo steel is three times as strong as 17-7 PH.

Strength-Weight Ratios—Short time tensile, yield, and creep strengths per unit of weight are compared with other materials of high strength-weight ratios at the top of these pages.

In tensile tests, the inadequacy of the strongest commercial aluminum alloy for high temperature service is apparent. The C110 M titanium alloy compares to 17-7 PH steel in Condition TH1050. Above 500° F, the tensile strength-weight ratios of the PH 15-7 Mo steel bracket those of the heat treated 6Al-4V titanium alloy.

In compressive yield strength, the precipitation hardening stainless steels are superior to the C110 M, 8 per cent Mn, titanium alloy. At temperatures above 600° F, the PH 15-7 Mo steel in Condition RH950 is slightly stronger than the heat treated 6Al-4V titanium alloy.

Information on the long time creep behavior of hardened titanium 6Al-4V alloy is scarce. From data at hand, it appears that the PH 15-7 Mo steel is superior in its ability to resist permanent deformation under sustained loading for 1000 hours at elevated temperatures. Much of the current research on the precipitation hardening steels and the titanium alloys is aimed at further improving creep behavior at the higher temperatures.

Production—Armco Steel Corp. is spending about $70 million for improvement and expansion at its Butler, Pa., Works to speed production of PH 15-7 Mo and other specialized steels.

To insure adequate supply, Armco will grant licenses to steel producers to make and sell precipitation hardening steels, says R. L. Gray, the corporation's president.

Tape Control Shines in Test

A job that takes 104 hours to do by tracer, including template preparation, takes only 3½ hours with numerical control . . . Packaged tape unit will sell for $10,000

HOW do you measure the effectiveness of numerical control?

The Aircraft Industries Association has come up with a helpful report.

Here's an example it cites—time comparisons for tracer performance vs. tape on the same part:

Tracer Control	
Office paperwork	3.0 hours
Templates	97.5
Tracer machining	3.6
Boring	0.5

Magnetic Tape Control	
Office paperwork	1.0 hours
Computer data processing	1.5
Machining	0.9
Boring	0.1

Including complete setup, that's 104.6 hours for tracer, 3.5 for tape.

The test showed a 66.6 per cent time reduction in office paperwork, a 98.5 per cent time cut in data processing, and 75 and 80 per cent cuts in contouring and boring times.

The tape control portion of the test was run on a standard machine which was converted to magnetic tape. Times are for the first piece run. (It was machined on the same day the shop first saw the drawing.) A close, 12-hour inspection turned up no cause for rejecting the part.

Packaged Tape Control

GE's Specialty Control Dept. is set to introduce a pre-engineered, two motion control package. Deliveries are scheduled to start in November.

Each unit will cost "under $10,000 net" and can be applied to any machine that requires point-to-point positioning of linear or rotary motions. The big potential will be on jobs where a specially engineered tape control unit couldn't be justified.

Called the Mark II, it is designed to control two motions from data stored in punched tape or manually set switches. It can be used on automatic or semiautomatic machines.

Milling Titanium

Do you need to do any milling on titanium? If so, here are some tips suggested by A. L. Winkler, senior manufacturing engineer, manufacturing research and development, Martin Co., Baltimore:

Use helical carbide (45 degree) slab mills. Avoid butt milling. Use 80 to 120 sfpm for carbide end and slab milling jobs. Use sulfur base oil flow or spray mist coolants liberally. Get dull tools out of the machine immediately. Don't try plunge cuts with carbide end mills. Design all fixtures for maximum rigidity. Cut in the direction of maximum support. With cast alloy cutters, use 80 to 100 sfpm. High speed steel cutters work best at 30 to 50 sfpm. Don't stop milling cutters while they're in the cut.

The list is abbreviated. A comprehensive article on titanium milling by Mr. Winkler is scheduled to appear in STEEL next week.

Cuts Milling Time

Throwaway cutters, a new milling head, increased speeds, produce impressive savings

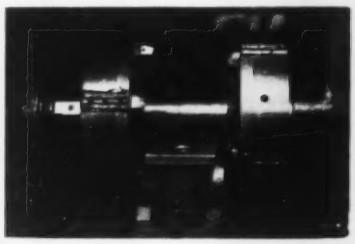
SPECIAL milling cutters using throwaway insert tools reduced machining time more than 80 per cent at Reliable Machine & Mfg. Co., Cedar Rapids, Iowa.

Tool costs are less than 1.5 per cent of those of the former method, says the toolmaker, Kennametal Inc., Latrobe, Pa.

Old Tooling—The milling cutters were developed to solve a machining problem with a chain-driven, No. 4 Becker-Brainard mill. Two, 3-in. faces were straddle milled on cast steel pivot ends held by a fixture.

Original tooling consisted of two, 12-in. diameter cutters. Each held 22, high-speed steel inserts.

The new cutters are 12 in. in diameter. Each has four cutter holders with Grade K21 square inserts. Inserts have eight cutting edges.



STRADDLE MILL
. . . saves with throwaway cutters

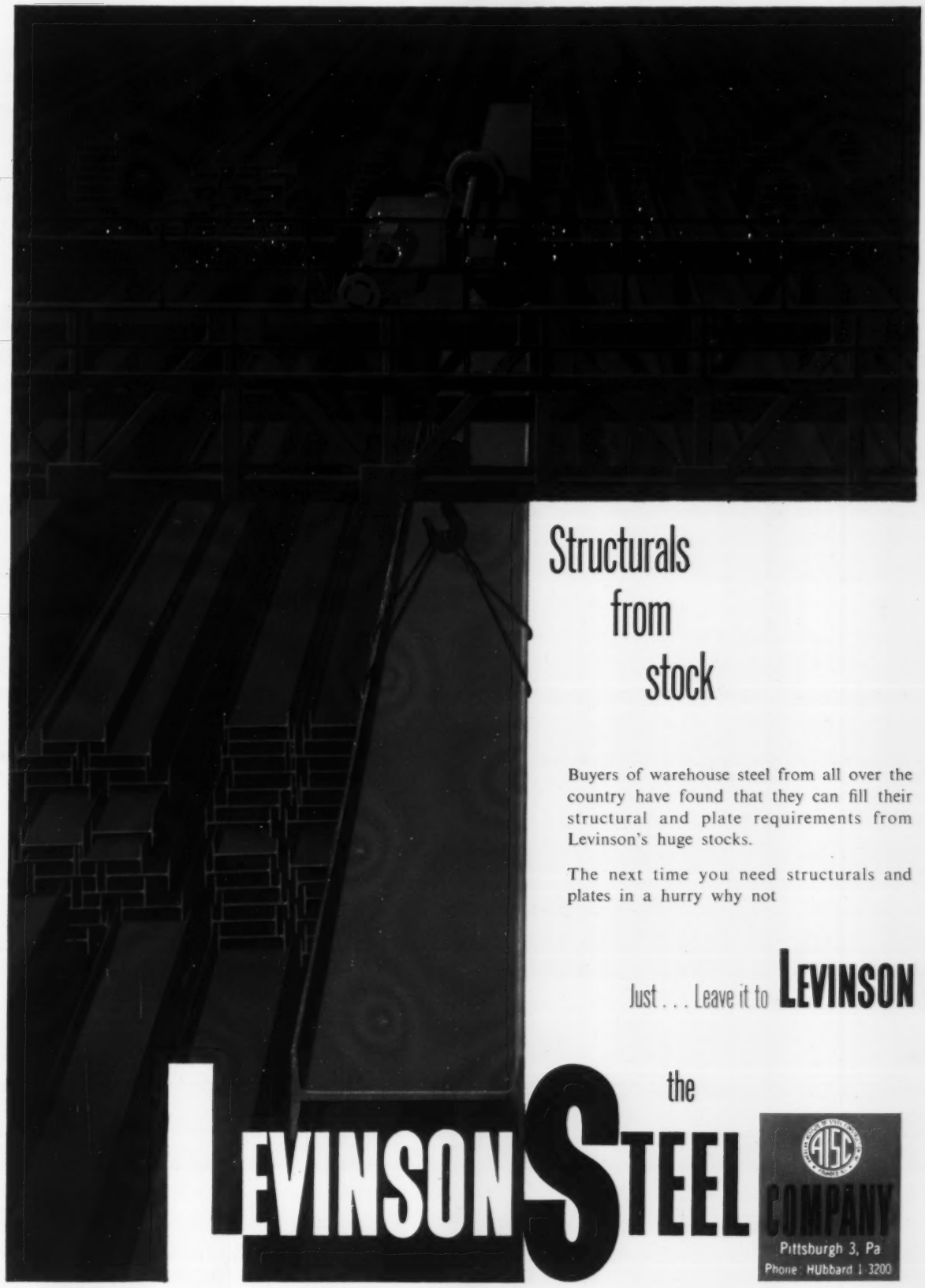
Heavy cutter bodies produce a flywheel effect. It helps overcome the limited power (5 hp) of the milling machine.

Speeds, Feeds Changed—The old setting of 31 rpm (with back gear) was changed to 240 rpm (750 sfpm). Feed was upped from 0.250 to 1.5 in. per minute.

Occasional hard spots in the castings formerly kept blade life at 5 to 50 pieces per grind. The new cutters can handle up to 800 pieces before wearing out—a 1500 per cent increase.

New inserts cost $6.80, or 0.85 cents for each piece machined.

By comparison, the high speed steel counterpart ran costs to 60 cents for each piece.



Structurals from stock

Buyers of warehouse steel from all over the country have found that they can fill their structural and plate requirements from Levinson's huge stocks.

The next time you need structurals and plates in a hurry why not

Just . . . Leave it to **LEVINSON**

the LEVINSON STEEL COMPANY

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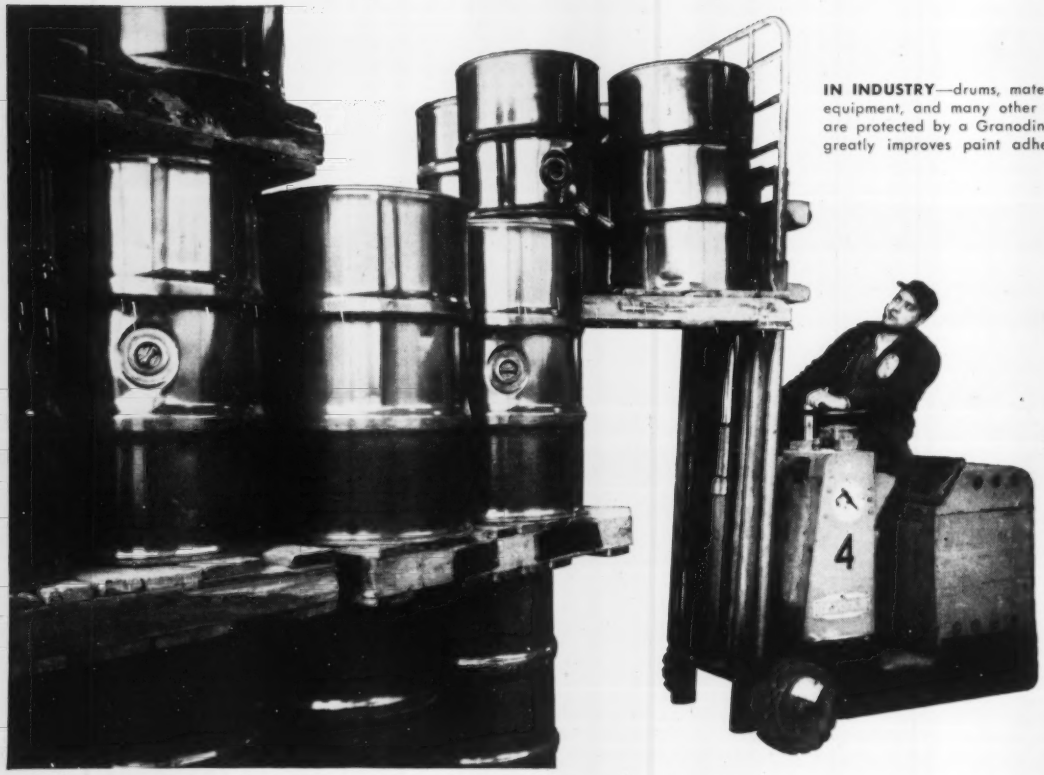


IN INDUSTRY—drums, materials handling equipment, and many other steel products are protected by a Granodine base, which greatly improves paint adhesion.

ACP *Granodine*® —BASE FOR DURABLE PAINT FINISHES ON DRUMS, MATERIALS HANDLING EQUIPMENT, AND OTHER STEEL PRODUCTS USED IN INDUSTRIAL PLANTS

Granodine Process	Type of Coating	Method of Application	Government Specifications
Granodine 20	Zinc phosphate (microcrystalline)	Dip	Jan-C-490, Grade 1 MIL-C-490A, Grade 1 MIL-S-5002 U. S. A. 57-0-2, Type II, Class C
Granodine 30	Zinc phosphate	Spray	Jan-C-490, Grade 1 MIL-C-490A, Grade 1 MIL-S-5002 U. S. A. 57-0-2, Type II, Class C
Granodine 45	Zinc phosphate	Dip	Jan-C-490, Grade 1 MIL-C-490A, Grade 1 MIL-S-5002 U. S. A. 57-0-2, Type II, Class C
Granodine 65	Zinc phosphate	Spray	Jan-C-490, Grade 1 MIL-C-490A, Grade 1 MIL-S-5002 U. S. A. 57-0-2, Type II, Class C
Granodine 80	Zinc Phosphate	Spray / Dip	Jan-C-490, Grade 1 MIL-C-490A, Grade 1 MIL-S-5002 U. S. A. 57-0-2, Type II, Class C
Granodine 500	Iron phosphate	Spray	
Granodine 50	Zinc phosphate	Brush	Under certain conditions this process will meet one or more of the above specifications

ACP Granodine firmly bonds the paint finish on many steel products used in industrial plants, giving them lasting protection by converting the surface to a non-metallic phosphate coating. This chemically deposited film greatly increases the adhesion of the finish and also provides high corrosion resistance — even when used in conjunction with a relatively thin and flexible paint film.

LEARN MORE ABOUT ACP GRANODINE Bulletin 1380 describes the various types and gives information which will help you select the proper one for your particular application. Write for your copy today.

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.

DETROIT, MICH. • ST. JOSEPH, MO. • NILES, CALIF. • WINDSOR, ONT.

CHEMICALS ACP PROCESSES

New Chemical Horizons for Industry and Agriculture

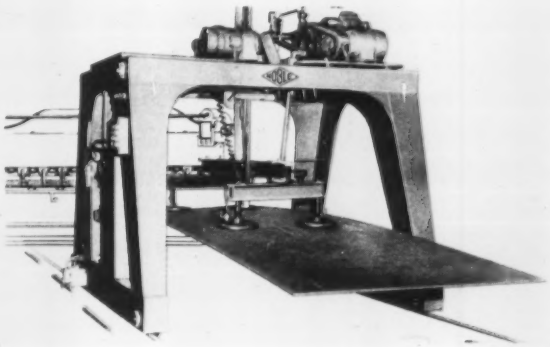
Automatic Plate Handler Moves 20-Ft Lengths

Strip, sheet, or plate stock from 6 to 96 in. wide is delivered to shears, presses, and cleaning or polishing machines by a line of plate handling systems. Capacities: 1000, 2000, 3000, and 4000 lb.

The handler will pick up from piles or conveyers as high as 36 in. A vacuum lift handles virtually all types of sheet or plate stock without marring polished or finished surfaces.

Protective coatings do not interfere with the operation.

Controls can be set for automatic, semiautomatic, or manual operation. *Write*: Noble Co., 1860 Seventh St., Oakland 20, Calif. *Phone*: Templebar 2-5785



Adjustable Speed Drives Provide Smooth Acceleration

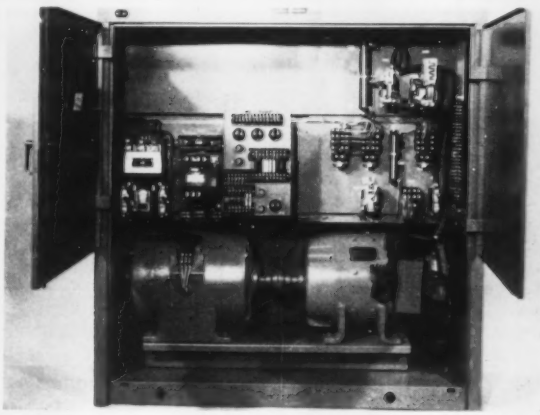
This line of Speed Variators, packaged adjustable speed drives, comes in sizes up to 500 hp. Speed ranges are available from 8:1 to 50:1, and higher.

The drives feature an Ampistat generator voltage regulator which uses silicon rectifiers. The silicon rectifiers show no aging under normal conditions.

The static excitation system requires no warm-up period. It also uses silicon rectifiers.

The adjustable drives are designed for use on continuous processing lines, calender drives, machine tools, cranes, hoists, rolling and blooming mills—or adjustable speed or fine tension control.

Class B insulation is used in the drives. *Write*: Direct Current Motor & Generator Dept., General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211



Lathes Have 32 Spindle Speeds, From 13 to 1500 Rpm

This line of lathes is used in toolroom and production turning. Model 2013 has a 21-in. swing over the bed ways. Model 2516 has a 25-in. swing.

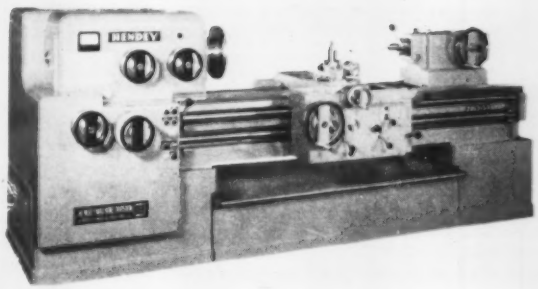
Crowned, flame-hardened spur gears are used in the head.

You can get a large number of speed changes by merely shifting them. Only two large handwheels are used to select and shift spindle speeds which are in geometric progression.

The spindle is supported at the ends and the middle by three sets of tapered roller bearings.

The two-speed tailstock permits rigid centering of work for fast turning.

A multiple-thread indexing spindle cuts any number of threads divisible into 48. Sixty-six thread and feed changes can be selected through two dials on the gear box. *Write*: Hendey Machine Div., Barber-Colman Co., Rockford, Ill. *Phone*: 7-5741

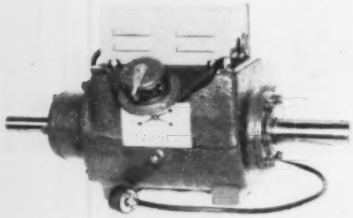


NEW PRODUCTS and equipment

Automatic Clutch

Model 8100-EC is an automatic clutch transmission. It can change speeds under power and can be reversed without stopping or reversing the motor.

Input torque rating is 700 lb-in. Output is 2800 lb-in. Capacity of the transmission is from 1:1 to 6.00:1. A reverse is possible with an adapter.



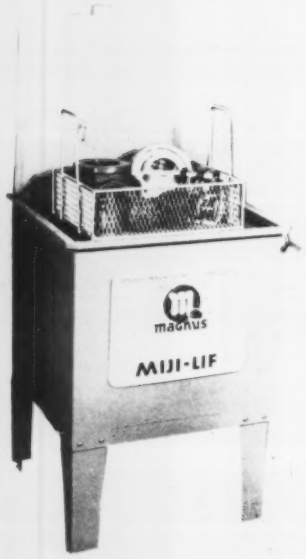
Electric clutches are used to change speeds with tape, time limit, cam, or other automatic controls. *Write*: Western Mfg. Co., 3400 Scotten Ave., Detroit 10, Mich. *Phone*: Tyler 6-1806

Batch Cleaner

The Miji-Lif can clean up to 75 lb of metal parts at a time. It can also be used to apply protective coatings.

Moving the operating lever brings the platform to the top of the tank and out of the liquid for inspection, loading, and unloading of the work.

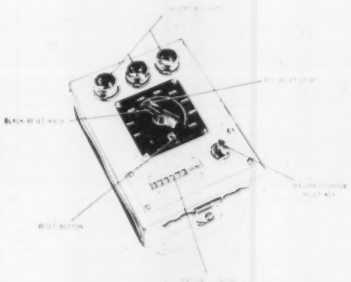
When the work is lowered to the bottom of the tank, it is automatically agitated up and down in the solution. The unit is operated by compressed air. *Write*: Equipment Div., Magnus Chemical Co. Inc., Garwood, N. J. *Phone*: Sunset 9-0200



Cutting Tool Control

Toolitrol consists of counter units installed on single or multiple spindle machines, providing visible signals when tools need changing.

The number of parts to be produced before a tool change is required is set on the unit. A green light on a control panel indicates that the machine and counter are operating. When the tool reaches 80 per cent of the number of cycles permitted, an amber light warns the operator.



The operator can see which tools can be changed during the next downtime period and handle them in groups on multiple spindle machines to reduce work stoppages.

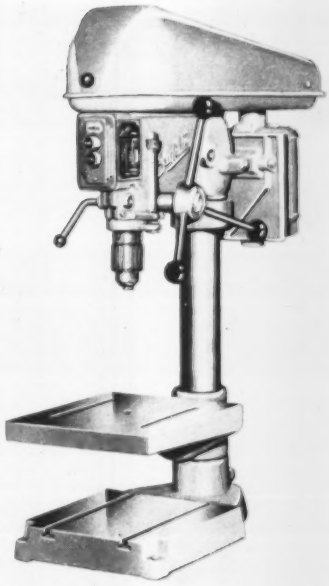
When the permitted number of cycles is reached, a red light indicates the need for an immediate tool change.

An optional relay will stop the machine automatically. *Write*: Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill. *Phone*: Bishop 7-5900

Drills

The line of No. 15 drilling machines includes bench, floor, and pedestal models. Bench and pedestal types are available in one to six-spindle models.

The belt guard tilts upward to simplify speed changes. The motor bracket is hinged so that the belt



may be changed from one step to another on the pulleys without adjusting the bracket. Belt tension is maintained automatically.

No tools are needed to adjust the head or table. *Write*: Buffalo Forge Co., Buffalo, N. Y. *Phone*: Cleveland 4567

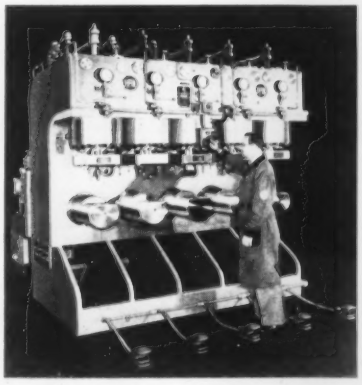
Multiple Station Press

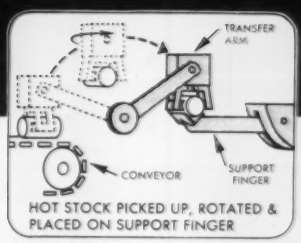
Punching and embossing are done by this open gap horn press. A welded steel frame houses five main cylinders and ram assemblies which are controlled individually by a pedal.

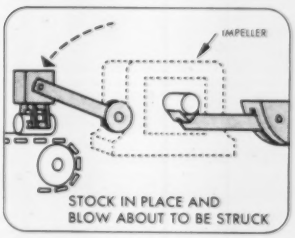
Each of the rams has a capacity of 100 tons. The tonnage of each ram is adjustable down to 4 tons.

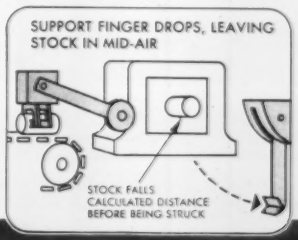
Each ram has a 6-in. stroke. Maximum daylight between the ram adapter and horn is 12 in.

The diameter at the base of each









FORGING IN MID-AIR . . . without grips . . . without sprues . . . without shock or vibration, *in a completely automatic operation!* This is but one of the possibilities in Cecomatic Forging based on the revolutionary Chambersburg Impacter and utilizing the Cecomatic Gravity Feed. Investigate the potentialities of the Cecomatic Process for forging production in varying degrees of automation. Write or phone us.

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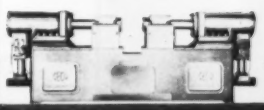
Shockless, vibrationless forging  *in the IMPACTER is the basis of*

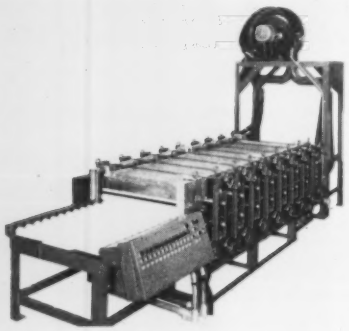
THE CECOMATIC FORGING PROCESS

horn is 11 in. Length of the horn from the throat is 20 in. From the throat to the centerline of the ram is 15 in. *Write*: Hydraulic Press Mfg. Co., division of Koehring Co., Mt. Gilead, Ohio.

Sheet Scrubber

Top and bottom surfaces of flat metal plates are cleaned of oil, grit, and surface accumulations by this industrial scrubbing machine.

A detergent and water solution is pumped onto the plates as they are conveyed through the machine by feed rolls. The plates are then scrubbed and scrub-rinsed with nylon cylindrical brushes. The plates pass through an air squeegee and come out clean, dry, and ready for subsequent operations.

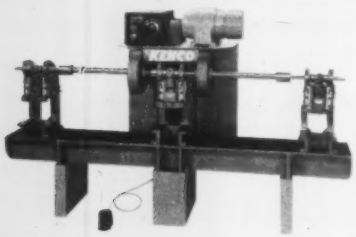


Maximum width capacity is 38 in. Sheets can be processed at a rate of 100 fpm. *Write*: Machine Div., Fuller Brush Co., Hartford 15, Conn. *Phone*: Jackson 2-2141

Triple Punch Press

Three 5-ton punch presses are mounted on a frame in this unit which does long, progressive die work and punching, forming, and blanking with long die sets.

Crankshafts and rams are synchronized. The drive engages the crankshaft at a central point, eliminating differences in torsional twist.



The presses are set on 42 in. centers. Total die area is 8 x 102 in. *Write*: Kenco Mfg. Co., 5211 Telegraph Rd., Los Angeles, Calif. *Phone*: Angeles 1-7955

Transmission Belt

Extremultus is a power transmission belt that will not slip or stretch. It operates at speeds up to 24,000 ft a minute and horsepowers to 6000. It will deliver smooth, constant speed at low tensions and relatively low speeds.

The belt will operate at ratios up to 20:1 and arcs of contact as low as 90 degrees. It reduces bearing loads and operates efficiently under shock loads up to seven times the normal running loads.

The belt is made of a special type of polymer and a chrome tanned leather. The polymer is the tensile member and the leather is the friction surface.

Tensile strength of the polymer is 28,500 psi. *Write*: Extremultus Inc., 405 Lexington Ave., New York 17, N. Y. *Phone*: Oxford 7-9180

Magnetic Clutch

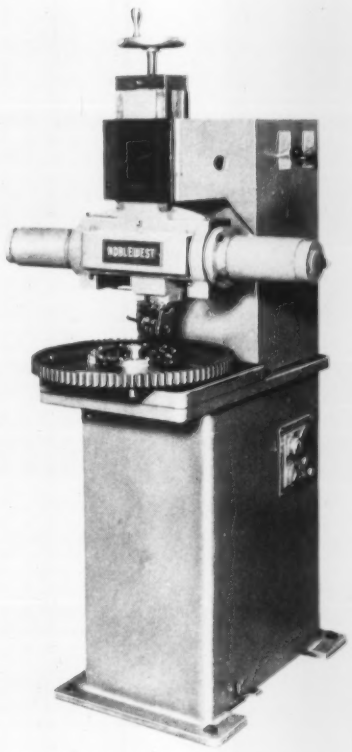
Torque ranges from 25 oz-in. up to 170 lb-in. are provided by a line of clutches. They use stationary magnets which eliminate collector rings.

All of the clutches are wound for direct current. Maximum ratings range from 28 volts on the smaller clutches to 90 volts on the larger sizes. *Write*: Stearns Electric Corp., 120 N. Broadway, Milwaukee 2, Wis. *Phone*: Broadway 2-1100

Marking Machine

Turbine discs for aircraft engines are roll marked by Model 487 Duomatic. The depth of mark is controlled by air pressure preset at a regulator. An air-operated slide accommodates the roll marking tools and travels laterally to perform the job.

A dual control system makes it possible to operate the pressure ram and the die slide independently



for short runs or for setup.

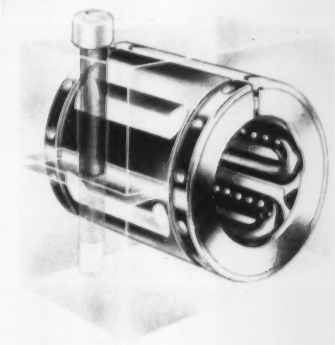
The large flat bed is suitable for similar large flat workpieces. The machine base and column are made to order so that gap and reach can be varied. *Write*: Noble & Westbrook Mfg. Co., East Hartford, Conn. *Phone*: Butler 9-2717

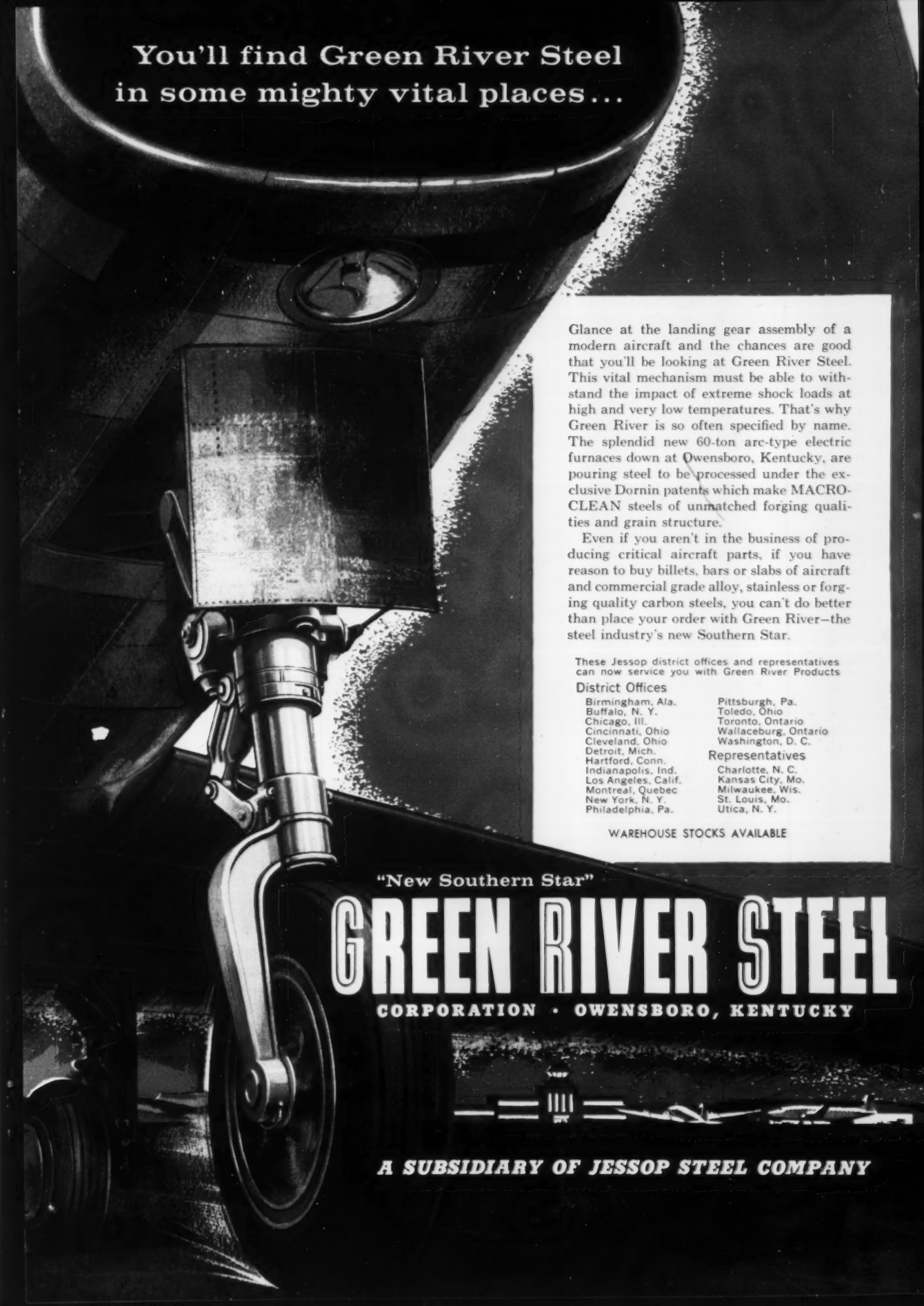
Bearing Adjusts Diameter

These ball bearings are split longitudinally to provide line-to-line or slight preload fits when mounted in an adjustable diameter housing.

The bearings are for linear motion. The tolerance on both the shaft diameter and the bearing bore can be adjusted.

Adjustable diameter ball bush-





Glance at the landing gear assembly of a modern aircraft and the chances are good that you'll be looking at Green River Steel. This vital mechanism must be able to withstand the impact of extreme shock loads at high and very low temperatures. That's why Green River is so often specified by name. The splendid new 60-ton arc-type electric furnaces down at Owensboro, Kentucky, are pouring steel to be processed under the exclusive Dornin patents which make MACRO-CLEAN steels of unmatched forging qualities and grain structure.

Even if you aren't in the business of producing critical aircraft parts, if you have reason to buy billets, bars or slabs of aircraft and commercial grade alloy, stainless or forging quality carbon steels, you can't do better than place your order with Green River—the steel industry's new Southern Star.

These Jessop district offices and representatives can now service you with Green River Products

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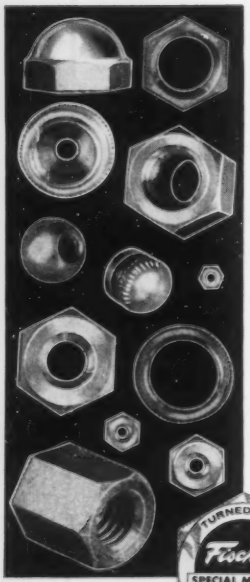

"Special" is our middle name. Regardless of your nut requirements, Fischer produces "specials" that will speed your assembly operations . . . and cut your costs.

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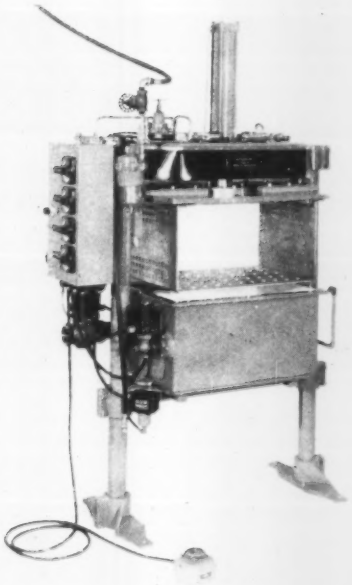
NEW PRODUCTS and equipment

ings are available for shaft diameters of 1 to 4 in. *Write*: Thomson Industries Inc., Manhasset, N. Y.

CO_2 Gassing

This vacuum chamber machine is used for gassing CO_2 cores used in making iron, aluminum, brass, and other castings.



It provides controlled gassing regardless of the size or geometry of the core. Use of gassing heads, stabbing needles, and venting are eliminated. *Write*: Alphaco Inc., P.O. Box 827, York, Pa.

Brazing Rod

Ampco-Braz No. 2 is a low-fuming, manganese-bronze rod used in brazing and braze-welding steel, cast iron, malleable iron, copper, and copper-base alloys. It is also used in overlaying bearings and other wear and corrosion resistant surfaces.

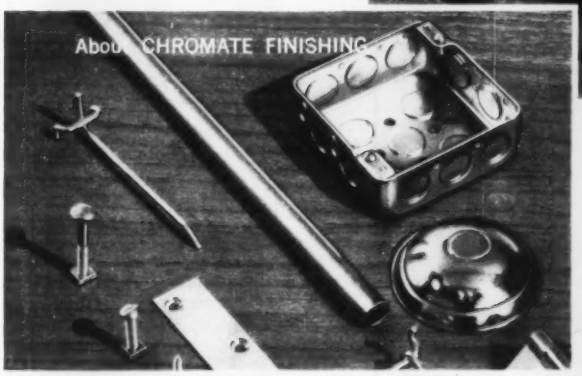
The rod provides smooth, dense, free-flowing deposits with excellent tinning action. Strengths up to 60,000 psi are produced. Deposit hardness is 80 to 110 Bhn. *Write*: Ampco Metal Inc., 1745 S. 38th St., Milwaukee 46, Wis. *Phone*: Mitchell 5-3750

from: Metal & Thermit
to: The IDEA Minded

New type chromium plate solves corrosion problems

Hydraulic piston rods plated with Unichrome Crack-Free Chromium by Bendix Products Division for their popular power steering mechanisms are helping to make driving safer and easier than ever. This innovation by Bendix provides increased protection against wear, corrosion, and hydraulic leaks.

Compared to ordinary chromium, Unichrome Crack-Free Chromium, developed by Metal & Thermit, stands out on resistance to corrosion, thermal shock, wear, and prevention of hydraulic fluid loss.



Costs little to brighten up sales

Given a choice, the customer always picks the brighter product. That's one good reason to consider two newly developed Unichrome Dips that produce bright chrome-like finishes on zinc plated or galvanized products. Extreme economy is another. Costs for these dip compounds range between 30¢ and 60¢ per 1000 sq. ft. of surface treated. They're increasing shelf life and sales appeal of even the most competitively priced products . . . such as toy wheels, electrical conduit and boxes, and rough hardware.

Tank car turnaround costs less

"Very good", reported the inspector at a large chemical company. He was examining the interior of one of their tank cars coated with Unichrome Lining B-124. Twenty-two trips in contact with highly corrosive 92% phenol left little mark on the protective coating.

Companies using tank cars or tanks can benefit from this experience. With skilled firms in key locations now available to apply linings to open or closed tanks, no company has to forego the maintenance-saving, cost-cutting protection of enduring Unichrome Tank and Drum Linings.

PLATING MATERIALS
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NEW literature

Write directly to the company for a copy

Self-Locking Bolts

Slotted-type "place" bolts, a cold formed bolt with an elastic diaphragm in its head (which furnishes additional elastic elongation when the bolt is tightened), are covered in this 8-page bulletin. National Machine Products Co., Utica, Mich.

Automation

Basic units for automation that is easy to retool are illustrated in Bulletin 117, 8 pages. Included is a description of a hydraulic slide for horizontal or angular motion. Baker Bros. Inc., Toledo 10, Ohio.

Bending Machines

More than 65 applications in bending tubing, pipe, extrusions, and rolled sections are illustrated in this 22-page bulletin, 356. Bending practices are discussed, and specifications of all standard machines are included. Pines Engineering Co. Inc., 601 Walnut St., Aurora, Ill.

Fork Lift Trucks

Bulletin 1317, 4 pages, describes a battery powered truck which has a capacity of 2000 lb at 48 in. A gasoline powered truck of the same capacity is covered in Bulletin 1380, 4 pages. Baker-Raulang Co., Box 5579, Cleveland 2, Ohio.

Precision Machining

Numerical control as applied to jig borers, vertical hole grinders, and other machine tools for the translation of blueprint data into a series of machine positions is discussed in a 12-page bulletin. Precision jig borer tools and accessories are listed in another 12-page bulletin. Pratt & Whitney Co. Inc., Charter Oak Boulevard, West Hartford 1, Conn.

Milling Machines

Bulletin 119 analyzes plain and universal models of a milling machine. Specifications include speeds, feeds, table size, rapid traverse speeds, and other capacity and operational characteristics. Greaves Machine Tool Co., 2011 Eastern Ave., Cincinnati 2, Ohio.

High Strength Steels

Bulletin ASL 289M, 4 pages, gives the results of the heat treatment of alloys containing chromium and molybdenum. Yield strength, tensile strength, elongation, reduction of area, and Brinell hardness at various annealing temperatures are listed. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Valve Catalog

This 136-page Catalog 57 covers a complete line of bronze and iron body valves. Included are bronze gate valves with a renewable seat ring, composition disc bronze swing check valves, and solder end globe valves with drain. A data section presents information for the fast appraisal of the pipe sizes required for particular flow applications. Catalog Dept., Fairbanks Co., 393 Lafayette St., New York 3, N. Y.

Battery Users' Manual

Motive power batteries (the type used in lift trucks), their maintenance, repair, and selection are discussed in this 44-page manual, GB-1599A. It is designed as an aid to plant engineers, superintendents, and foremen in conducting battery training courses. Gould-National Batteries Inc., Trenton 7, N. J.

Cold Finished Steel Bars

This wall chart lists machinability ratings and chemical analyses of 241 grades of steel bars including screw machine, resulfurized carbon, open hearth, and alloy steels. A table lists weights in pounds per foot of round, square, and hexagon steel bars in thicknesses or diameters of 1/32 to 6 in. Advertising Dept., La Salle Steel Co., P. O. Box 6800-A, Chicago 80, Ill.

Fasteners

One-piece screws with a ratchet-like element that grips the work securely are described in this 4-page bulletin. Pittsburgh Screw & Bolt Corp., P.O. Box 1708, Pittsburgh 30, Pa.

Machine Tools

Bandsaws, cutoff machines, drill presses, radial drills, grinders, and a belt and disc surfacer are included in this 48-page catalog. Capacities, speeds, and dimensions are listed apart from the general descriptions. Dept. 1000, Walker-Turner Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

Safety Clothing

Lightweight clothing made of aluminized asbestos is illustrated in this 4-page bulletin. Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

Carbon Brushes

Bulletin GEA-6688, 8 pages, tells how to get the best performance out of carbon brushes. Topics covered include brush life, metal transfer, commutator threading, bar marking, and commutator adjustment. General Electric Co., 1 River Rd., Schenectady 5, N. Y.

Rectifiers

This 4-page bulletin describes selenium, germanium, and silicon rectifiers for electroplating, anodizing, and electrochemical processing. Frederic B. Stevens Inc., 1800 18th St., Detroit 16, Mich.

Carbide Tools

Catalog 857 tells how to select the proper tool for the job and shows detailed applications and dimensions of each tool. Full details are given on standard carbide tools and blanks, lapped inserts, and toolholders. Besly-Welles Corp, South Beloit, Ill.

Die Sets

Special die sets and bolster plates are described in a 16-page bulletin, 70-A, Section 2. Die Supply Div., E. W. Bliss Co., 1400 Brookpark Rd., Cleveland 9, Ohio.

Plating and Anodizing

An automatic machine which can plate or anodize up to 240 racks an hour is described in this 8-page bulletin. Lasalco Inc., 2820 LaSalle St., St. Louis 4, Mo.

Sealless Pumps

Uses and performance data of plastic and stainless steel pumps are included in Catalog 10.0, 8 pages. Vanton Pump & Equipment Corp., 201 Sweetland Ave., Hillside, N. J.

Spherical Bearings

Features and engineering data on a line of spherical bearings and rod ends are presented in Bulletin 257. Sealmaster Bearing Div., Stephens-Adamson Mfg. Co., Ridgeway Avenue, Aurora, Ill.

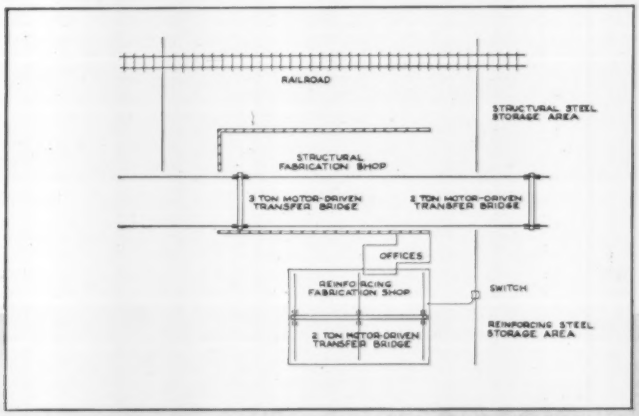
FILMS AVAILABLE

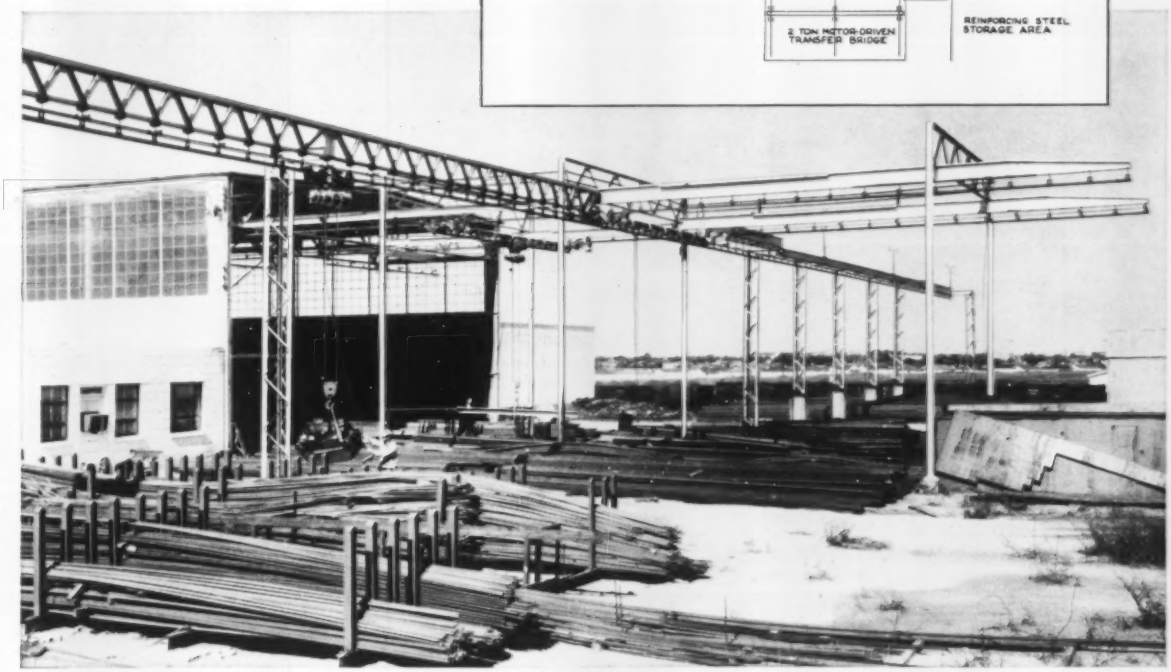
"Tooling the Bandsaw for Production" describes the versatility of this accurate tool. Shaping, slotting, splitting, and facing operations are shown in the 16-mm color movie. Time: 10 minutes. DoAll Co., Des Plaines, Ill.

"Hydraulic Oils" is a 25-minute color movie which shows the principles of hydraulic laws and demonstrates the uses of premium oils. The Texas Co., 135 E. 42nd St., New York 17, N. Y.

"Inside-outside" Tramrail System
BOOSTS STRUCTURAL SHOP PRODUCTION 66%

Although Thornton Steel Co. is an important steel fabricator and could readily make equipment to handle its materials, it has installed Cleveland Tramrail throughout its yard and plant because it recognizes the importance and advantages of materials handling equipment especially designed and built for the purpose.





MAN-HOURS required for fabrication of trusses and various steel work for buildings were cut an average of 40% with a Cleveland Tramrail system by Thornton Steel Co., Fort Worth, Texas.

Thus, without expanding the plant structure, or adding to fabricating machinery or working force, production was stepped up 66%.

Being situated in a part of Texas where winters are not severe, much of the work is carried on out-of-doors. Tramrail transfer cranes and carriers serve both inside and outside the plant. This enables delivering materials from various parts of the yard to any part of the shop without rehandling. Thus materials are moved fast and efficiently in the least possible time.

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Overhead Materials Handling Equipment

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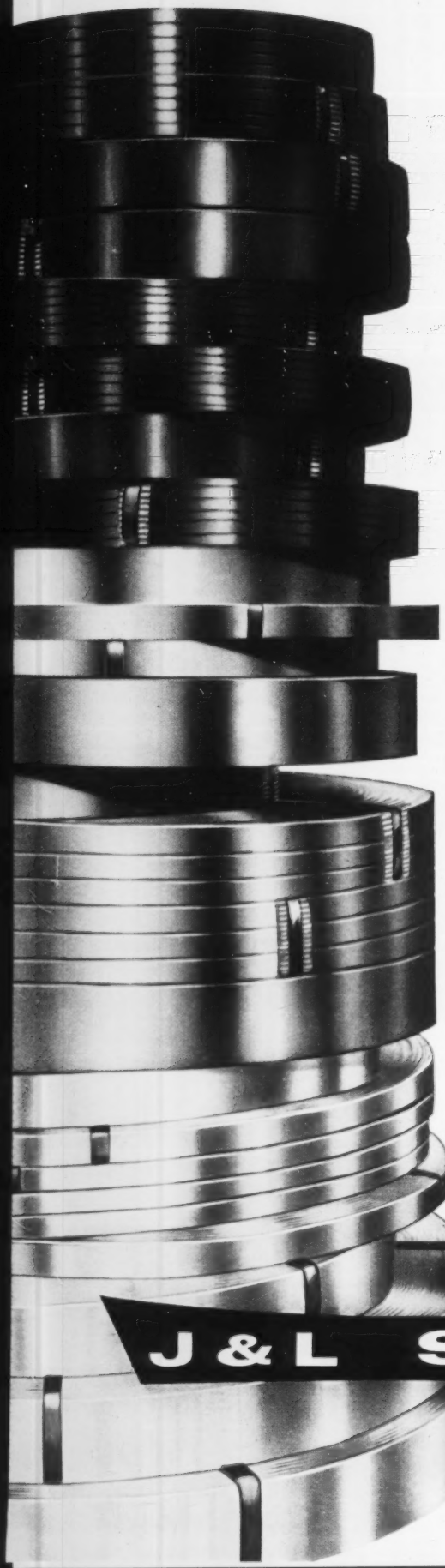

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Metal fabricators who rely on J&L for cold rolled strip steel enjoy the comfortable feeling of knowing that no better source exists for specialty strip products.

That's J&L strength—the ability to supply both standard and restricted specifications in a wide range of cold rolled strip steel grades and qualities from any one of four plants similarly equipped.

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J & L STRIP STEEL

Market Outlook

STEEL is moving into consumption at a slightly faster pace than it was, but the pickup in consumers' specifications is disappointing. Automotive requirements are a little heavier than they were, so are orders from appliance and farm implement manufacturers. Still, over-all demands are not up to expectations.

PROCUREMENT STRETCHOUT—Consumers appear to be stretching out their orders over a longer period. They are buying largely for early needs. With relatively quick mill shipments available in most products (heavy plates and wide flange structurals are exceptions), there is less need to anticipate far forward requirements.

TONNAGE SUBSTANTIAL—Despite the comparatively slow pace of ordering (contrasted with that of a year ago) volume is substantial. In most products it compares favorably with that in most recent years, though the mills are not under intense pressure because of the greater availability resulting from increased production capacity.

SHEET BOOKINGS UP—Automotive tonnage is swelling sheet order backlogs. September sales bettered August's, and October volume should be larger. Yet, mill sales managers think they will have to push customers hard to get in heavy forward tonnage. A few auto orders for November shipment are being received.

OTHER LINES GAIN—Steelmakers also note a bit of an upturn in demands from the farm implement industry. It was expected. Farmers are having a better year than they did in 1956, which should be reflected soon in increased implement production. Purchases by appliance manufacturers also are up, though far from boom proportions.

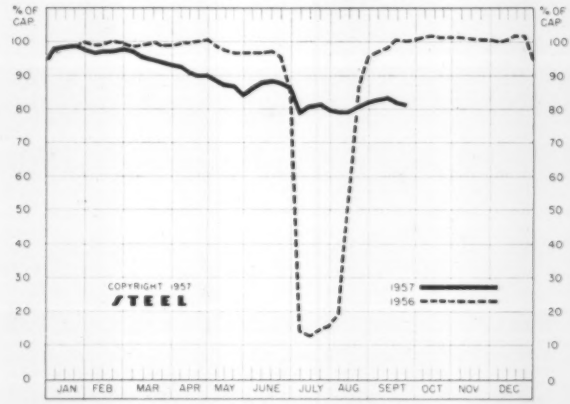
SHORTAGES FADE—Except for heavy plates and wide flange structurals, supply shortages have about disappeared. Standard shapes are in easier supply, and light plates are readily available. Sheets are a little harder to get; some producers of cold-rolled are sold out for October. Bars are available for prompt shipment in most sizes.

PRODUCTION—Steelmaking operations declined for the second straight week. The national ingot rate last week eased ½ point to 81 per cent of capacity. That is equivalent to production of about 2,073,000 net tons of ingots and steel for castings, or about the same tonnage produced weekly from mid-July to mid-August.

STRIKES REFLECTED—The post Labor Day showing in production is disappointing. But it is explained in part by labor trouble at a couple plants. Youngstown Sheet & Tube's Indiana Harbor and South Chicago plants recently lost five days' output due to an unauthorized strike. Republic Steel's Gadsden plant was down a couple days because of a strike by cranemen.

SCRAP DECLINING—Failure of the steel rate to rise sharply is responsible for the continued slump in scrap. Prices on the steelmaking grades are still falling. STEEL's composite on No. 1 heavy melting dropped another $2 for the fifth consecutive week. At $48.17 the composite is on the lowest level since the end of May.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Sept. 22	Change	Same Week 1956	Same Week 1955
Pittsburgh	82	+ 1*	98.5	99.5
Chicago	82	+ 2*	102	97.5
Mid-Atlantic	87	+ 2	98	93
Youngstown	79	+ 2	102	100
Wheeling	93.5	+ 1	97.5	96.5
Cleveland	80	— 2.5*	105	100.5
Buffalo	100	0	107.5	105
Birmingham	76.5	+ 3.5*	95.5	95.5
New England	52	0	92	88
Cincinnati	82.5	— 0.5*	89	85
St. Louis	83	— 3.5	88	92.5
Detroit	97.5	+ 0.5	99	95
Western	95	+ 1	99	94
National Rate	81	— 0.5	100	96

INGOT PRODUCTION‡

	Week Ended Sept. 22	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	129.2†	130.5	130.8	154.2
NET TONS (In thousands)	2,076†	2,097	2,101	2,477

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 73

Technical Outlook—p. 117

Good Materials are only the beginning of good steel

It takes good men — every step of the way — to produce good steel from even the best of materials.

As a supplier, the most we can do is to furnish your men with the finest nickel alloys we can produce — sealed, furnace-ready cartons of uniform pig, each marked with exact weight and analysis. While we know that quality material alone may not insure good steel, we're confident it's one of the essentials.

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Rising demand for large power transformers like this means. . .

Silicon Steel To Go Places

"THE OLD RULE that generating capacity doubles every ten years may require amending soon. Electric equipment manufacturers now tell us they expect capacity to double every seven years."

That's what officials at Wheeling Steel Corp., Wheeling, W. Va., say. It's one major reason why they and other producers are highly optimistic about long term sales outlook for silicon steel. The product is a must in electric motors, rotating equipment, generators, and transformers.

Steady Growth—Use of magnetic steels doesn't grow in direct proportion to use of power because larger units use steel more efficiently, and the steel itself is constantly being improved. But growth in production of oriented and nonoriented silicon grades is not far behind that of the electrical industry.

Other electrical sheet producers are equally cheerful as they view the future, although they admit to certain dull spots in the current market picture. Says a Pittsburgh producer: "Sales of nonoriented silicon sheets are low because of a lack of strength in appliance manufacturers' orders. Demand is firm for grain oriented silicon, but supply in the second half of this year is ample to meet requirements. Until power and distribution requirements slipped early this year, demand had required capacity operations for all grain oriented facilities."

Could Be Tight—Producers of grain oriented silicon can't rest too long in the fourth quarter. Sales managers warn that a general tightening in sheets during the final quarter could result in some users of silicon having difficulty obtaining all they want. At least one producer has warned its customers to place orders now for the October-December period if they want to be certain of delivery.

Statistics show sales in the first half of 1957 trailed record years by about 15 per cent. The record year for production was 1953, when shipments totaled 820,096 tons. After slipping in 1954 and 1955, shipments climbed back to 813,381 tons in 1956. At a slightly slower pace, shipments in the first seven months of 1957 came to 401,200 tons. There is no comparable figure for 1956 because of the industry strike.

Inventory Problem — Salesmen face a double inventory problem in selling silicon to appliance producers this year. Those manufacturers built up large stocks. When their sales failed to meet expectations, they held inventories of silicon as well as unsold appliances containing silicon.

In some cases, strong competition in the appliance industry curtailed use of electrical sheets. Some electric fan manufacturers reportedly substituted carbon steel for silicon to lower costs. Silicon salesmen say this lowers the fan's life expectancy as well as its initial cost. The consumption of current is higher in carbon steel fans. Substitution of carbon is said to be satisfactory in motors that run for short periods intermittently.

Slow Today—Sales of silicon to producers of fractional horsepower motors are slow. Requirements for small motors in such appliances as garbage disposal equipment dwindled this year due to the lower rate of home construction.

Several markets show considerable strength. Demand is good

from producers of integral motors. Sales are strong to manufacturers of heavy rotating equipment. Export business is fairly good, despite a falling off in purchases from South America. Sales to Canada and Europe are steady.

But Faster Soon—Silicon sales managers assume a more cheerful air when talking about 1958 and beyond. One producer predicts 1 million tons of silicon sheets will be produced annually in the early sixties, with demand approaching 1.2 million tons by 1964.

Producers back up the prediction with expansion plans. Wheeling Steel announced plans for a new continuous core plate line for silicon steel coils at Beech Bottom, W. Va. Last year a continuous annealing furnace was installed at that plant. Armco Steel Corp., Middletown, Ohio, is carrying out construction of new facilities to increase production of grain oriented electrical steel in 1958. Republic Steel Corp., Cleveland, completed an expansion program in Warren, Ohio, early this year. While the capacity may be more than is required this year, don't look for it to remain idle for long.

Stainless Steel . . .

Stainless Steel Prices, Page 171

Gradual gains are reported in sales of stainless strip to the automotive industry. Producers are hoping for more improvement next month because strip is one of the slowest moving stainless items.

In other stainless products, demand is steady. Plates, sold to producers of industrial equipment, are in strongest demand.

Sheets, Strip . . .

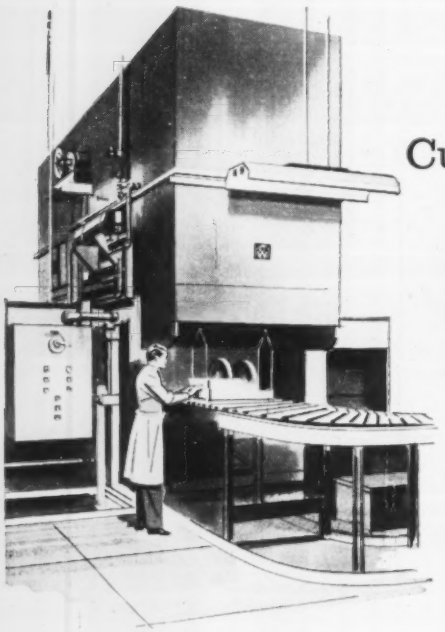
Sheet & Strip Prices, Pages 166 & 167

Sheet order volume is increasing, largely reflecting improved demand on automotive account.

Tonnage placed for October shipment in the East is well above that for shipment this month. Some automotive tonnage is coming through for November delivery. Other consumers are not stepping up specifications in like degree. Buying by most users continues to be spotty. The improvement in demand on automotive account extends to the 430 grade stainless.

While buying by New England consumers is slightly heavier for October, third quarter volume (notably September) is under expectations. Over-all tonnage trails that of last year by 15 to 20 per cent. Auto requirements in the area are only slightly heavier. One of the largest stamping plants (at Boston) is down. Buyers are not anticipating requirements to any great extent with prompt shipments available. A New England producer of cold-rolled strip is curtailing production of carbon grades, concentrating on more profitable finishes and edges. Competition with slit sheets prompts this change in product policy. Stainless production will be stepped up.

After a gradual gain this month, several of the larger Pittsburgh sheet suppliers expect a leveling off in demand, with October's total shipments slightly above those of September. November tonnage is



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Ultrasonic Degreaser DB4-60
cleans hundreds of metal parts in **minutes**

Ultrasonics – the science of high frequency vibrations – is today revolutionizing cleaning techniques. Curtiss-Wright ultrasonic cleaning and degreasing equipment has developed to a point where it is now practical for all types of production parts. High precision instruments, hair-thin electronic components and mass produced parts are thoroughly cleaned in seconds.

Pictured above is the new Curtiss-Wright Degreaser DB4-60 which cleans and degreases 95% of the precision parts of a Curtiss-Wright Turbo-Compound aircraft engine prior to assembly. Where formerly this operation took hours, these parts are now cleaned in minutes – and cleaned more thoroughly.

The Curtiss-Wright line of standard and custom ultrasonic cleaning and degreasing units varies in size from 8″ x 8″ x 10″ to an ultrasonic area 38″ x 66″ x 36″. Automatic conveying equipment and servo controls are utilized where required by production volume.

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expected to about equal that in October. Sellers' estimates are clouded by uncertainties with respect to new model auto sales.

Gains in sales to appliance makers are reported, but they continue in small lots.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 165

Reinforcing bar producers in the Pacific Northwest continue in full production, but their backlogs have declined noticeably the last month or so. Recent placements have been small, but the outlook is considered promising with extensive road and freeway projects pending in Washington and adjacent states involving large quantities of bars—the largest is the proposed Washington State Hood Canal floating bridge involving 6300 tons —bids Oct. 15.

In the San Francisco market, demand for building bars has slowed down with a drop in construction activity. One local area plant that depends heavily on reinforcing bar tonnage is operating at about 34 per cent of capacity.

Steel Bars . . .

Bar Prices, Page 165

At some points, demand for merchant bars continues disappointing. At others, an encouraging pickup in orders is reported.

Eastern mills report hot-rolled bar bookings are slightly heavier for October with deliveries ranging two to four weeks. Cold-finished users are buying small lots as required, but they are not building inventories. Forging shops are not materially increasing their tonnage for the fourth quarter.

Availability and prompt shipments on carbon bars continue to shorten leadtime in New England. Cold-finished is available from stock in a substantial range of sizes and grades. Hot rolled buying is slow, and while inventories are lower, converters' stocks of cold rolled tend to ease demand for replacement. Alloy bar demand is dragging even more than that for carbon, but a slight increase in stainless bar buying for October-November is noted.

Predictions of improvement in bar sales this month have failed to materialize at Pittsburgh.

Wire . . .

Wire Prices, Pages 167 & 168

October wire demand is slow and spotty. Volume is only slightly ahead of that in September. Rod orders are light, with customers depending on inventories to a large extent.

Users of finished wire are buying close to their requirements. Requirements beyond a month-to-month basis are being placed in only a few instances.

Consumers aren't as optimistic as they were about the fourth quarter outlook for fasteners and high carbon steel springs. Competition with imported merchant wire products, notably nails, is sharp.

Automotive buying of wire items is a little heavier for October, but is in smaller volume than had been anticipated.

Rod buying for fourth quarter is slightly heavier in the East, the bulk of specifications being for

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Your most exacting specifications take precision form in the hands of our expert craftsmen. Bolts—Studs—Cap Screws—Nuts as specified to resist corrosion, extreme temperatures and tensile stresses are the product of more than 40 years continuous production of highest quality fasteners for a wide diversity of industries.
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How can Analytical Equipment squeeze out more profit dollars?

By making rapid, accurate analyses — in seconds — on the production floor!

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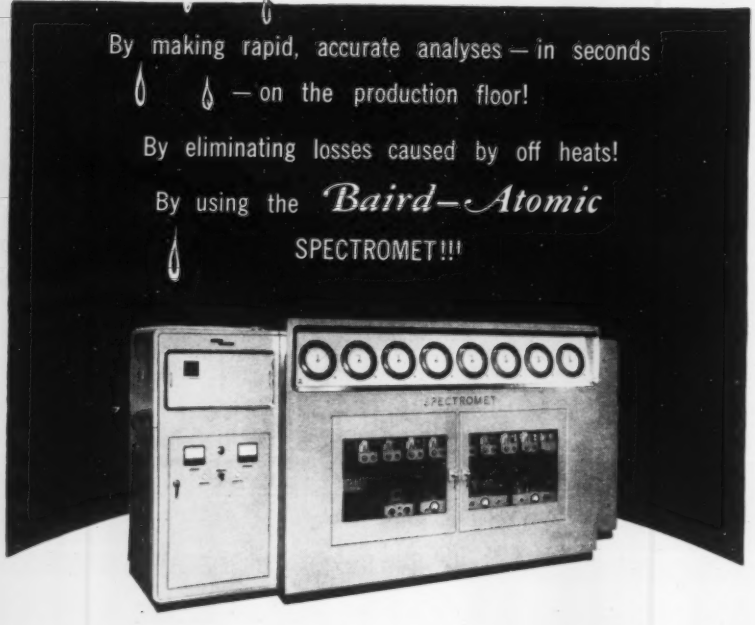

Analyses of metals in production maintains a constant high level of quality control, at a production rate requiring minimum furnace time.

Another plus — the savings in alloys. The B-A Spectromet provides percent concentration within 60 seconds, thus less alloying materials are lost during meltdown. Speed and accuracy are inherent features of the B-A Spectromet.

The moment spent to write for full details will be well rewarded.

BAIRD ATOMIC

Baird-Atomic, Inc.

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October shipment. For some months rod users have been drawing on inventory, and the mild increase points to more open gaps in stocks. The upturn in manufacturers wire and merchant products is slight.

Plates . . .

Plate Prices, Page 165

Demand for sheared plates is active, with November rolling schedules filling. Eastern shipyards, with heavier backlogs, are placing more plate tonnage. The Newport News Shipbuilding & Dry Dock Co. has a contract for a supercollier from the Pocahontas Steamship Co. It will be a self-unloading carrier with a cargo capacity of 24,000 tons.

Universal and strip plate buying in the East is easier. Most users of strip plate have built up stocks and are not pressing the mills for tonnage as they were some time ago.

Pittsburgh area producers think over-all demand for plates should be as strong in the fourth quarter as it has been in previous periods.

Tubular Goods . . .

Tubular Goods Prices, Page 171

Demand for steel pipe is up slightly in New England. Distributors' stocks are substantial and well balanced in the area. Only seamless pipe, 12 in. and larger, offers any procurement problem, and deliveries in this classification are improving.

Tubular goods stocks are backing up with utilities, and some seamless pipe shipments are being deferred.

Mechanical tubing is moving slowly, and some pipe sizes are being produced on tubing mills. Deliveries of stainless tubular goods are back to normal.

The city of Seattle soon will call for bids on cast iron pipe supplies for several local improvement districts. The total may approximate 2000 tons. Portland, Oreg., has placed an order for 500 tons of cast pipe. A contractor's job in Seattle involves 200 tons. Other potential cast business in the Pacific Northwest indicates an active fourth quarter in the area.

Oil country tube producers are taking orders from domestic users

on shorter leadtimes than has been the case in previous quarters. They are certain of strong sales in October, but users have been placing orders for only one month at a time instead of for an entire quarter. Sales volume in November and December may decline, with the likelihod of a drop in the Rocky Mountain areas or in Canada due to seasonal conditions. Sales to southwestern oil producing areas are firm. Export demand is heavy.

Structural Shapes . . .

Structural Shape Prices, Page 165

Structural fabricating shops are more competitive for tonnage other than bridge work. They are estimating on thinner margins.

In the East, shop backlogs continue substantial, but they are declining with fewer building and construction projects coming up for estimates, notably industrial.

Boston fabricators are operating after a seven-week strike. Production costs in the area will be up $10 to $12 a ton, including higher steel and labor charges. Shops in this group formerly operated with a differential of 26 cents per hour over other New England fabricators, Connecticut excepted, and this margin is now widened.

A mild flurry in New England contracts includes 3000 tons for an insurance office building, Montpelier, Vt. Bridge estimating is slightly heavier in the area for delivery in mid-1958.

Pittsburgh area producers expect to have full order books in the fourth quarter, bolstered by a possible carryover of unfilled orders for wide flange beams.

Pig Iron . . .

Pig Iron Prices, Page 172

Falling prices in the cast scrap market continue to prompt some foundries to increase the use of scrap in their melts, reducing their merchant iron requirements. There is no tendency to stockpile iron for winter because foundries believe supplies will be available when wanted at stable prices.

Foundries are not getting as much business from the automotive industry as they had counted on for the fall season. Some are operating at less than a full week. The busiest are those making large

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Or, if your application calls for a special-type fastener, Prestole engineers will gladly analyze your particular needs without obligation. These fastener technicians will carefully consider the problems of cost, assembly, torque and tensile strength, material and end-use requirements. Their recommendations will be based on years of experience and "know-how" in the fastener field.

Prestole designs and produces fasteners made from low carbon, spring, and stainless steel, phosphor bronze, beryllium copper, brass, and aluminum, etc. Many standard and special types of finishes can be provided to meet customer specifications.

Whatever the size, shape, or application requirements may be—Prestole can serve you *better* with the *best* in fasteners of ferrous or non-ferrous materials.

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Anaconda Aluminum Coiled Sheet

ALUMINUM COILED SHEET produced to the high standards of quality and uniformity maintained by The American Brass Company is now available for prompt shipment from our Torrington Division to all points in the United States.

It is rolled on the most modern, high-speed equipment. X-ray controlled to close tolerance in gage. High-speed, electronically operated slitters give exact widths with clean edges on evenly and tightly wound coils. Latest annealing furnaces—with controlled atmosphere and temperature—provide high uniformity of metal structure to meet specified mechanical-property limits.

IN THESE WIDTHS: Maximum 28 inches
Minimum 3/8 inch

IN THESE THICKNESSES: Maximum 0.064 inch
Minimum .006 inch

COIL WEIGHTS: Up to 100 lb. per inch of width

ARBOR SIZES: 4, 6, 8, 10, 12, 16, and 20 inches in diameter

ALLOYS: 1100, 3003, 3004, 5005, 5050, 5052

TEMPERS: Alloy Nos. 1100, 3003, 5005
–O, –H12, –H14, –H16, –H18
Alloy Nos. 3004, 5005, 5050, 5052
–O, –H32, –H34, –H36, –H38

FOR IMMEDIATE ACTION, call The American Brass Company Office nearest you. The American Brass Company, Waterbury 20, Conn. 5794

ANACONDA®
ALUMINUM COILED SHEET
Made by The American Brass Company

castings for railroad equipment concerns.

Shipments to New England foundries are slightly heavier, reflecting spotty improvement in pouring of castings in that district. Some melters permitted inventories to decline to the point where additional iron is required for even a slight gain in orders. Textile mill equipment shops are still operating well under capacity, and some are booking job work.

The pig iron market in the St. Louis district has been weakened by Canadian underselling.

Blast furnace "A" at the Neville Island (Pa.) Works of the Pittsburgh Coke & Chemical Co. was blown in Sept. 11 after complete relining and installation of new equipment. It has been adapted to permit production of standard ferromanganese in addition to pig iron. The unit's stove capacity was increased 30 per cent since ferromanganese requires higher blast heats than conventional pig iron. It has a daily production of 900 tons of pig iron.

Iron Ore . . .

Iron Ore Prices, Page 173

Fewer American iron ore carriers are operating on the Great Lakes than was the case a year ago, reports M. A. Hanna Co., Cleveland. Of the 251 vessels in the fleet, 239, or 95.22 per cent, were in commission on Sept. 15. That compares with 249 in operation a month ago, or 99.20 per cent.

A year ago, the entire American lake ore fleet was in operation. In contrast, 12 ships are now laid up for the remainder of the season. They include eight vessels of the Interlake Steamship Co.'s fleet, two of the Columbia Transportation Co.'s fleet, and two of Bethlehem Transportation Co.'s fleet.

Shipments of lake ore in August totaled 13,172,356 gross tons, according to the Lake Carriers' Association. This compares with 8,045,028 tons in the like month last year.

Shipments of Lake Superior iron ore in the week ended Sept. 16 totaled 2,801,417 gross tons, reports the American Iron Ore Association. Comparison: 3,182,818 gross tons in the like week of 1956.

ANY PLATER CAN AFFORD
THIS NEW ANSWER TO AN
OLD CHROME PLATING PROBLEM

UDYLITE
ZERO-MIST H.T.*

NOW YOU CAN COMPLETELY CONTROL MIST AND SPRAY FROM CHROMIUM PLATING BATHS

AT A VERY REASONABLE COST

LOW INSTALLATION COST: This new product of Udylite Research is so powerful that you need add only 1½ *pounds* to a 1000 *gallon* chromium plating solution to get perfect results.

LOW MAINTENANCE COST: The addition of as little as ¼ to ½ lb. in an 8-hour working day maintains mist and spray control. Its only loss is through dragout.

COMPLETELY STABLE: It's *completely stable;* it doesn't lose any of its strength during shut downs no matter how long they must be.

OPERATES AT HIGH TEMPERATURES: For the first time *the temperature of the bath has no effect on mist control.* Zero-Mist H.T.* works at any bath temperature, even boiling.

EASE OF CONTROL: It's *easy to control.* With the addition of Zero-Mist H.T.*, a thin foam blanket subsides when current is turned off, but reforms as the bath is again used. This foam blanket provides the simple visible check for efficient operation.

LOW COST • VISUAL CONTROL
STABILITY • *HIGH TEMPERATURE OPERATION

ZERO-MIST H.T. HAS THEM ALL

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

Cumulative shipments through Sept. 16 amount to 63,791,478 tons, an increase of 15,670,416 tons, compared with 48,121,062 tons moved in the like period of the 1956 season.

Steel Ingot Production—August, 1957

Period	— OPEN HEARTH— Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	—TOTAL— Net tons	Per cent of capacity
1957								
January ..	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
February .	8,898,671	99.2	277,682	80.4	810,853	87.8	9,987,206	97.6
March	9,442,164	95.1	275,156	71.9	871,754	85.2	10,589,074	93.4
1st Qtr. ..	28,170,526	97.7	847,677	76.3	2,566,839	86.4	31,585,042	96.0
April	8,820,328	91.8	231,731	62.6	762,721	77.1	9,814,780	89.5
May	8,842,707	89.1	201,864	52.8	747,752	73.1	9,792,323	86.4
June	8,498,903	88.4	210,915	57.0	681,584	68.9	9,391,402	85.6
2nd Qtr. ..	26,161,938	89.8	644,510	57.4	2,192,057	73.0	28,998,505	87.2
1st 6 Mo..	54,332,464	93.7	1,492,187	66.8	4,758,896	79.7	60,583,547	91.5
*July	8,086,519	81.4	194,638	50.9	627,575	61.4	8,908,732	78.6
†August ..	8,289,000	83.5	205,000	53.6	724,000	70.8	9,218,000	81.3
1956								
January ..	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February .	9,043,064	101.3	296,543	78.0	799,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.3	819,465	85.7	10,924,788	100.2
1st Qtr. ..	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	96.2
June	8,664,605	93.9	282,846	71.9	773,546	83.6	9,720,997	92.1
2nd Qtr. ..	27,472,717	98.1	887,224	74.3	2,375,217	84.6	30,735,158	96.0
1st 6 Mo. .	55,987,195	100.0	1,817,062	76.1	4,802,915	85.6	62,607,172	97.8
July	1,330,151	13.9	.....	....	292,012	30.5	1,622,163	14.9
August ...	7,213,274	75.6	189,564	46.6	719,759	75.3	8,122,597	74.5
September..	9,342,796	101.2	286,978	72.9	792,885	85.7	10,422,659	98.8
3rd Qtr. ..	17,886,221	63.2	476,542	39.5	1,804,656	63.6	20,167,419	62.3
9 Mo.	73,873,416	87.6	2,293,604	63.8	6,607,571	78.2	82,774,591	85.9
October ...	9,841,002	103.2	330,101	81.2	877,410	91.8	11,048,513	101.3
November .	9,430,248	102.2	295,827	75.2	829,425	89.6	10,555,500	100.0
December .	9,695,919	101.6	308,465	75.9	833,161	87.1	10,837,545	99.4
4th Qtr. ..	28,967,169	102.3	934,393	77.4	2,539,996	89.5	32,441,558	100.3
2nd 6 Mo..	46,853,390	82.8	1,410,935	58.5	4,344,652	76.5	52,608,977	81.3
Total 1956	102,840,585	91.6	3,227,997	67.4	9,147,567	81.2	115,216,149	89.8

Note—The percentages of capacity operated in 1957 are calculated on Jan. 1, 1957, annual capacities of: Open hearth, 116,912,410 net tons; bessemer, 4,505,000 net tons; electric, 12,041,740 net tons; total, 133,459,150 net tons. The percentages of capacity operated in 1956 are calculated on Jan. 1, 1956, annual capacities of: Open hearth, 112,317,040 net tons; bessemer, 4,787,000 net tons; electric, 11,259,050 net tons; total, 128,363,090 net tons.
*Revised. †Preliminary figures, subject to revision.

Imported Steel

Prices per 100 lbs. (except where otherwise noted) landed, including customs duty, but no other taxes.

	Atlantic & Gulf Coast	West Coast	Vancouver	Montreal
Deformed Bars (⅜" Dia. incl. all extras)	$6.78	$7.01	$6.76	$6.44
Merchant Bars (¼" Round incl. all extras)...	7.62	7.85	7.48	7.22
Bands (1"x⅛"x20' incl. all extras)	7.76	7.98	7.65	7.38
Angles (2"x2"x¼" incl. all extras)	6.57	6.75	6.99	6.69
Beams & Channels (base)	6.82	7.00	7.24	6.94
Furring Channels (C.R. ¾", per 1000')	26.62	27.77	....	....
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's, bright, low C, (11½ga.)	7.38	7.52	8.52	8.52
Wire, galvanized, low C, (11½ ga.)	8.01	8.15	9.42	9.42
Wire, Merchant quality, bl. ann., (10 ga.)...	7.60	7.75	8.78	8.78
Rope Wire (.045", 247,000 PSI, incl. extras)..	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14G, 92 lbs. net)....	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C, per 100')...	8.48	8.83	....	....
Casing (5½", 15.5 J55, T & C, per 100')	194.00	199.00	....	....
Tubing (2⅞", 6.4 J55, EUE, per 100')	103.00	104.00	....	....
Forged R Turn. Bars, C-1035 (from 10" di.).	14.00	14.23	14.00	13.74

Ask prices on: Bulb tees, bolts and nuts, manganese steel plates and shapes, welded wire reinforcing mesh and hardware cloth, boiler tubes, A-335-P11 pressure pipe.

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BOCHUMER VEREIN World's first Steel Foundry, 1842—Vacuum degassed Forgings. Pinion wire and spring wire for watches and clocks.
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In Canada: Kurt Orban Canada, Ltd., Vancouver, Toronto, Montreal

Ferroalloys . . .

Fluorspar Prices, Page 173

Prices for Simplex low carbon ferrochrome will be raised 2 cents a pound on Oct. 1 by the Electro Metallurgical Co. The increase applies across the board to all grades, regular and nitrogen bearing, and to all sizes and quantities. The new base price for the maximum 0.025 per cent grade is $0.3675 per pound of contained chromium, and for the maximum 0.010 per cent carbon grade, $0.3775.

Semifinished Steel . . .

Semifinished Prices, Page 165

Nearly one week's output of steel was lost by Youngstown Sheet & Tube Co. when 200 shopworkers—machinists, electricians, and carpenters—walked out in an unauthorized strike Sept. 11, forcing the company to close its Indiana Harbor and South Chicago plants for five days, idling 12,000 workmen.

Steel Output Sets Record

Production of steel set a record in the first eight months this year, reports the American Iron & Steel Institute. Total output was 78,710,279 net tons, compared with the previous record of 76.6 million tons in the first eight months of 1953.

Output in the like period of last year was only 72.3 million tons, but production in the period was adversely affected by the steel strike during July.

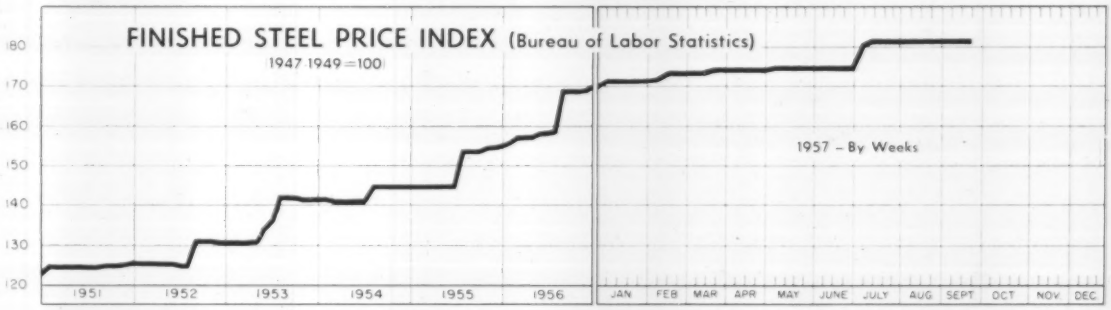
Operations averaged 88.6 per cent in the first eight months, based on ingot capacity of 133,459,150 net tons annually as of Jan. 1.

August output totaled 9,218,000 net tons, compared with 8,908,732 in July, and with 8,122,597 in August a year ago.

During the month, steelmaking furnaces operated at an average of 81.3 per cent of capacity, compared with 78.6 per cent in July.

The index of production (1947-49 equals 100) during August was 129.6 against 125.2 in July. The index for the first eight months was 141.1 against 129.2 in the like period of 1956.

Price Indexes and Composites



Sept. 17, 1957	Week Ago	Month Ago	Aug. Avg.	Year Ago
181.5	181.5	181.5	181.5	168.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 17

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.600	Bars, Reinforcing	6.210
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.245
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
		Tubes, Boiler (100 ft)	49.130
		Tubing, Mechanical, Carbon (100 ft)	24.953
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.225
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Sept. 18 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	225.71	181.40
Index in cents per lb	6.479	6.479	6.479	6.114	4.914

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$146.19	$146.19	$146.19	$137.75	$111.66
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT	48.17	50.17	53.50	59.67	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point

FINISHED STEEL	Sept. 18 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.715	4.93	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.525	5.00	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.50	5.50	5.50	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.00
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.10-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.35	5.90-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.85	$8.95

*Including 0.35c for special quality.

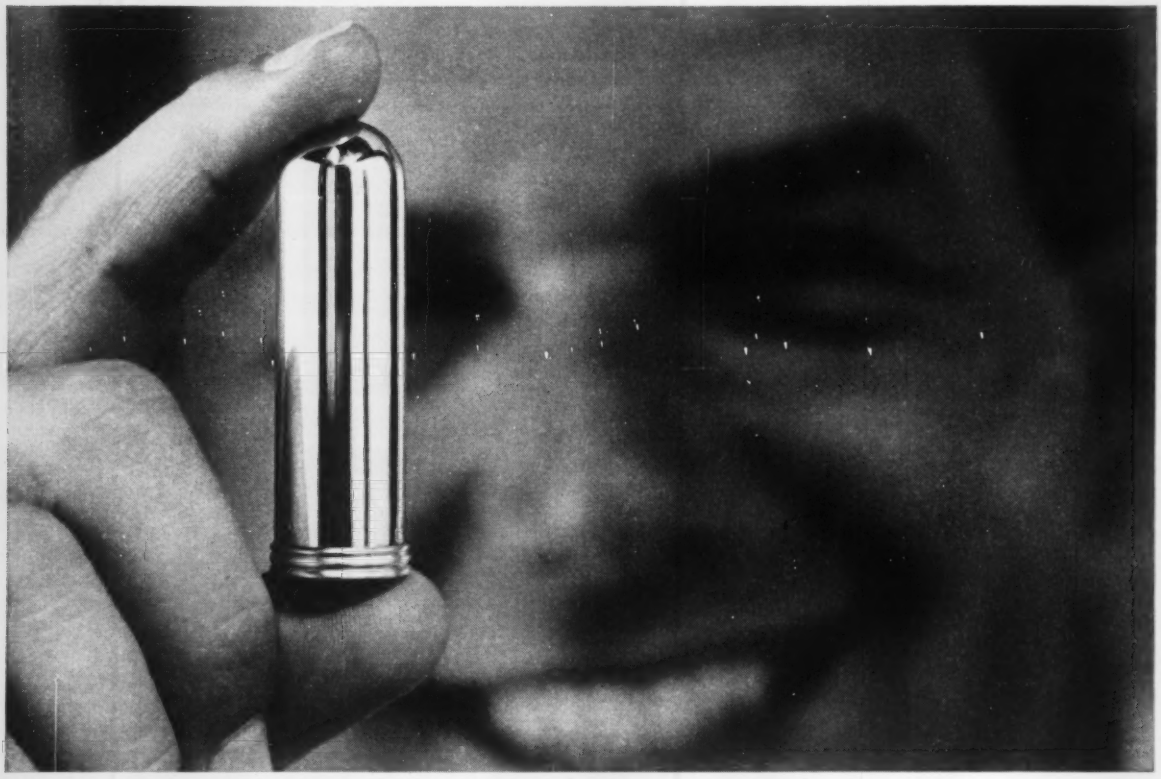
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.15	6.15	6.15	5.80	4.325

PIG IRON, Gross Ton	Sept. 18 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.01	70.01	69.88	66.26	59.25
No. 2 Fdry, NevilleIsland,Pa	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila.	70.51	70.51	70.38	66.76	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry(Birm.)deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	215.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$49.50	$51.50	$55.50	$58.50	$44.00
No. 1 Heavy Melt, E. Pa.	45.50	48.00	52.00	59.00	41.50
No. 1 Heavy Melt, Chicago	49.50	51.00	53.00	61.50	42.50
No. 1 Heavy Melt, Valley	51.50	52.50	55.50	65.50	44.00
No. 1 Heavy Melt, Cleve.	48.50	49.50	52.50	63.00	43.00
No. 1 Heavy Melt, Buffalo	47.50	47.50	49.50	56.50	43.00
Rails, Rerolling, Chicago	64.50	65.50	74.50	84.50	52.50
No. 1 Cast, Chicago	44.50	44.50	46.50	53.50	50.00

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.25	$15.25	$15.25	$14.50	$14.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	17.50	17.00



This part finished better, cost less when degreased with NIALK® TRICHLORethylene

What do you do when a part that's supposed to be bright and glossy comes out of the vapor degreaser dull–tarnished–unacceptable for finishing?

This was the problem facing The Plume & Atwood Mfg. Co., Thomaston, Conn.

Plume & Atwood manufactures pen caps, pen barrels and lipstick cases by the million to their exceptionally rigid quality specifications. But the high luster buffed into these parts was being lost in the degreaser. Tarnished spots suddenly started to show up, making a good coating job impossible.

This is a fairly common problem in vapor degreasing. It's caused by the solvent you use turning acid. Solvent can go sour rapidly–unless it's protected by a neutral stabilizer that doesn't lose strength.

Plume & Atwood tried several different conventional degreasing solvents, without success. Results were "inconsistent"; solvent life was much too short. To keep the bath from going sour, P and A had to dump and clean out the degreaser *every three weeks.*

Solved...with NIALK

Then P and A switched to NIALK TRICHLORethylene. Result: immediate improvement. The first charge of NIALK solvent functioned without trouble for *nine weeks.*

There's no telling how much longer this charge would have continued in service, for at this point P and A installed newer degreasing equipment. Since then, NIALK TRICHLORethylene *has remained in service more than six months without once going sour.*

As a result, P and A feels that the tarnish problem is solved for good. Parts now come out of the degreaser untarnished and immediately ready for further processing.

"We're getting considerably better solvent mileage," says John Bradford, P and A's assistant to the plant manager, "and much improved gloss and luster at lower cost–thanks to NIALK!"

Only NIALK has psp

This example shows why you get *more effective, lower-cost* degreasing when you use NIALK TRICHLORethylene with **psp**–*permanent staying power.*

You *never* have to replenish the neutral stabilizer in NIALK. Even after many distillations, it's still there–working to prevent acid formation and other causes of breakdown. You go much longer, and degrease many more parts, between cleanouts. Cleanouts are easier, too, because NIALK actively retards the formation of degradation products in your degreaser.

For better degreasing, do this

See for yourself how you can keep *your* degreasers operating efficiently with NIALK–long after other solvents have lost their punch. Write us today on your business letterhead for the complete facts, including a resume of comparative metallurgical tests on five leading brands.

HOOKER ELECTROCHEMICAL COMPANY
1209 Union Street, Niagara Falls, N. Y.

HOOKER CHEMICALS PLASTICS

DUREZ® PLASTICS DIVISION • NORTH TONAWANDA, N. Y.
NIALK® CHEMICALS • NIAGARA FALLS, N. Y.
OLDBURY® CHEMICALS • NIAGARA FALLS, N. Y.

Sales Offices: Chicago, Ill.; Detroit, Mich.; Los Angeles, Calif.; New York, N. Y.; Niagara Falls, N. Y.; Philadelphia, Pa.; Tacoma, Wash.; N. Tonawanda, N. Y.; Worcester, Mass. *In Canada:* Hooker Chemicals Limited, N. Vancouver, B. C.

Steel Prices

Mill prices as reported to STEEL, Sept. 18, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 166; to footnotes, page 168.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell,Pa. S3 .....77.00
Lowellville,O. S3 .....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Bridgeport,Conn. N19 ..80.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B2 .....77.50
Lackawanna,N.Y. B2 ..77.50
Munhall,Pa. U5 .....77.50
S.Chicago,Ill. R2, U5 ..77.50
S.Duquesne,Pa. U5 ....77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$96.00
Bridgeport,Conn. N19 .101.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3 .101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 ....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2,U5,W14 ..96.00
S.Duquesne,Pa. U5 ....96.00
S.SanFrancisco B3 ....105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$114.00
Bridgeport,Conn. N19 .114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 ..121.00
Detroit S41 .....114.00
Economy,Pa. B14 .....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor,Ind. Y1 ....114.00
Johnstown,Pa. B2 ....114.00
Lackawanna,N.Y. B2 .114.00
LosAngeles B3 .....134.00
Lowellville,O. S3 .....114.00
Massillon,O. R2 .....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2,U5,W14 ..114.00
S.Duquesne,Pa. U5 ....114.00
Struthers,O. Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $122.50
Buffalo R2 .....117.50
Canton,O. R2 .....120.00
Cleveland,O. R2 .....117.50
Gary,Ind. U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ....117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 .....5.075
Munhall,Pa. U5 .....4.875
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ...6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....6.15
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1..6.15
Johnstown,Pa. B2 .....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P17 .....6.15
N.Tonawanda,N.Y. B11..6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 .....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2 ..6.25
Sterling,Ill.(1) N15 ....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 .....5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 .....5.275
Bessemer,Ala. T2 .....5.275
Bethlehem,Pa. B2 .....5.325
Birmingham C15 .....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1 .....6.075
Gary,Ind. U5 .....5.275
Geneva,Utah C11 .....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ...5.275
Johnstown,Pa. B2 ....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2..5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ...5.575
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ....5.50
Portland,Oreg. O4 ....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14..5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ...5.975
Weirton,W.Va. W6 ....5.275

Wide Flange
Bethlehem,Pa. B2 .....5.325
Clairton,Pa. U5 .....5.275
Fontana,Calif. K1 .....6.225
IndianaHarbor,Ind. I-2..5.525
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ....5.50
S.Chicago,Ill. U5 .....5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill. U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ..7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.325
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 .....6.225

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(15) A10 ...5.10
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 .....5.70
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 .....5.50
Conshohocken,Pa. A3 ..5.20
Ecorse,Mich. G5 .....5.20
Fairfield,Ala. T2 .....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 .....5.30
Harrisburg,Pa. P4 .....5.80
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.45
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale,Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown R2, U5, Y1..5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....7.35
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 .....6.75
Johnstown,Pa. B2 .....7.00
SparrowsPoint,Md. B2 ..7.00

PLATES, Wrought Iron
Economy,Pa. B14 .....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 .....7.625
Clairton,Pa. U5 .....7.625
Claymont,Del. C22 .....7.625
Cleveland J5, R2 .....7.625
Coatesville,Pa. L7 .....7.925
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 .....7.625
Ecorse,Mich. G5 .....7.725
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1..8.425
Gary,Ind. U5 .....7.625
Geneva,Utah C11 .....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 .....7.625
Lackawanna,N.Y. B2 ..7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, Alloy
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 .....7.20
Coatesville,Pa. L7 .....7.20
Economy,Pa. B14 .....7.20
Farrell,Pa. S3 .....7.20
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ...6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 .....6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10...5.35
Ashland l.c.l. (15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.425
Aliquippa,Pa.(9) J5 ....5.425
Alton Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ...5.425
Birmingham(9) C15 ....5.425
Bridgeport,Conn.(9) N19 5.65
Buffalo(9) R2 .....5.425
Clairton,Pa.(9) U5 ....5.425
Cleveland(9) R2 .....5.425
Ecorse,Mich.(9) G5 ....5.525
Emeryville,Calif. J7 ...6.175
Fairfield,Ala.(9) T2 ...5.425
Fairless,Pa.(9) U5 ....5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 .....5.425
Houston(9) S5 .....5.675
Ind.Harbor(9) I-2, Y1..5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 .....5.425
LosAngeles(9) B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
N.Tonawanda,N.Y.(46)B11 5.775
Pittsburg,Calif.(9) C11..6.125
Pittsburgh(9) J5 .....5.425
Portland,Oreg. O4 .....6.175
Seattle B3, N14 .....6.175
S.Ch'e'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5 ..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11 6.125
Youngstown(9) R2, U5 .5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 .....6.475
Bridgeport,Conn. N19 ..6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 .....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Economy,Pa. B14 .....6.475
Ecorse,Mich. G5 .....6.575
Fairless,Pa. U5 .....6.625
Farrell,Pa. S3 .....6.475
Fontana,Calif. K1 .....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 .....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ....6.475
Struthers,O. Y1 .....6.475
Warren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....7.925
Bessemer,Ala. T2 .....7.925
Bethlehem,Pa. B2 .....7.925
Bridgeport,Conn. N19 ..7.95
Clairton,Pa. U5 .....7.925
Cleveland R2 .....7.925
Ecorse,Mich. G5 .....8.025
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 .....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 ....7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2..7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ...5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 .....5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ...5.425
Tonawanda,N.Y. B12 ...5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 .....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.80
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 .....6.55
Youngstown U5 .....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ...9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 ....10.10
Chicago W18 .....9.925
Cleveland C20 .....9.925
LosAngeles P2, S30
(Grade A) 11.30
(Grade B) 11.80
Monaca,Pa. S17 .....9.925
Newark,N.J. W18 ....10.10
SpringCity,Pa. K3 ....10.10
Warren,O. C17 .....9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 .....7.90
Bridgeport,Conn. N19 ..7.65
Buffalo B5 .....7.35
Camden,N.J. P13 .....7.75
Carnegie,Pa. C12 .....7.30
Chicago W18 .....7.30
Cleveland A7, C20 ....7.30
Detroit B5, P17 .....7.50
Detroit S41 .....7.30
Donora,Pa. A7 .....7.30
Elyria,O. W8 .....7.30
FranklinPark,Ill. N5 ..7.30
Gary,Ind. R2 .....7.30
GreenBay,Wis. F7 .....7.30
Hammond,Ind. J5, L2 ..7.30
Hartford,Conn. R2 .....7.80
Harvey,Ill. B5 .....7.30
LosAngeles P2, S30 ....8.75
LosAngeles R2 .....8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 .....7.30
Monaca,Pa. S17 .....7.30
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 .....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ..7.85
S.Chicago,Ill. W14 ....7.30
SpringCity,Pa. K3 .....7.75
Struthers,O. Y1 .....7.30
Warren,O. C17 .....7.30
Willimantic,Conn. J5 ..7.80
Waukegan,Ill. A7 .....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa.M12,R2 8.775
Bethlehem,Pa. B2 .....8.775
Bridgeport,Conn. N19 ..8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ..8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 .....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 .....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2, S30 ..10.65
Mansfield,Mass. B5 ....9.075
Massillon,O. R2, R8 ..8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ...8.975
S.Chicago W14 .....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Worcester,Mass. A7 ...9.075
Youngstown F3, Y1 ....8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.425
Atlanta A11 .....5.625
Birmingham C15, S42 ..5.425
Bridgeport,Conn. N19 ...5.65
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ...6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 .....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary, Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1 5.425
Johnstown,Pa. B2 .....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 .....5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ...6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 .....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 .....5.425
S.SanFrancisco B3 .....6.175
SparrowsPoint,Md. B2 ..5.425
Sterling,Ill.(1) N15 ...5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ...6.00
Torrance,Calif. C11 .....6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.56
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 .....7.08
KansasCity,Mo. S5 .....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Pittsburgh J5, U8 .....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 .....7.08
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.325
ChicagoHts.(4)(44) I-2 5.425
ChicagoHts.(4) C2 ...5.425
Ft.Worth,Tex.(26) T4 ..5.875
Franklin,Pa. (3) F5 ...5.325
Franklin,Pa.(4) F5 ...5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 .....5.325
Tonawanda(3) R12 .....5.325
Tonawanda (4) B12 .....6.00
Williamsport,Pa. (3)S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ...4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fairless, Pa. U5 .....4.975
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Geneva,Utah C11 ....5.025
Granite City,Ill.(8) G4 ..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 ..4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ...4.925
Niles,O. M21, S3 ....4.925
Pittsburg,Calif. C11 ...5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2 ..4.925
Steubenville,O. W10 ...4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ....8.10

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 ....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 .....8.175
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2..7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ....7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ...6.05
Fontana, Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ....7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 .....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ....6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville, O. W10 .....6.05
Youngstown U5, Y1 ....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse, Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ....10.275
Gary, Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna (37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	....6.95	7.20
Gary,Ind. U5	....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	...6.95	7.20
Irvin,Pa. U5	.....6.95	7.20
Kokomo,Ind. C16	.7.05	...
MartinsFry. W10	.6.95	7.20
Pitts.,Calif. C11	.7.70	...
Pittsburgh J5	....6.95	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 .. 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 ....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ...6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 .....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ....6.60†
Pittsburg,Calif. C11 ..7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ...6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ...9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.425
Niles,O.(28) R2 .....7.425
Weirton,W.Va. W6 ...7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .9.25
Butler,Pa. A10 (type 2) .9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2,Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.65
Ind.Harbor,Ind. I-2 ...8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allengheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calmuet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymount Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer.Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.925
Allenport,Pa. P7 .....4.925
Alton,Ill. L1 .....5.125
Ashlnad,Ky.(8) A10 ...4.925
Atlanta A11 .....5.125
Bessemer,Ala. T2 ....4.925
Birmingham C15 .....4.925
Buffalo(27) R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 .....4.925
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Ind.Harbor,Ind. I-2, Y1 4.925
Johnstown,Pa.(25) B2 ..4.925
Lackaw'na,N.Y.(25) B2 4.925
LosAngeles(25) B3 ....5.675
Minnequa,Colo. C10 ...6.025
Pittsburg,Calif. C11 ..5.675
Riverdale,Ill. A1 .....4.925
SanFrancisco S7 .....6.35
Seattle(25) B3 .....6.35
Seattle N14 .....6.35
Sharon,Pa. S3 .....4.925
S.SanFrancisco(25) B3 5.675
SparrowsPoint,Md. B2 4.925
Sterling,Ill.(1) N15 ..4.925
Sterling,Ill. N15 .....5.025
Torrance,Calif. C11 ...5.675
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.10
Farrell,Pa. S3 .....8.10
Gary,Ind. U5 .....8.10
Houston S5 .....8.35
Ind.Harbor,Ind. Y1 ....8.10
KansasCity,Mo. S5 ....8.35
LosAngeles B3 .....9.30
Lowellville,O. S3 .....8.10
Newport,Ky. A2 .....8.10
Sharon,Pa. S3 .....8.10
S.Chicago,Ill. W14 .....8.10
Youngstown U5, Y1 ....8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2 .....7.325
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.425
Fairfield,Ala. T2 .....7.325
Farrell,Pa. S3 .....7.325
Gary,Ind. U5 .....7.325
Ind.Harbor,Ind. I-2, Y1 7.325
Lackawanna,N.Y. B2..7.325
LosAngeles(25) B3 ....8.075
Seattle(25) B3 .....8.325
Sharon,Pa. S3 .....7.325
S.Chicago,Ill. W14 .....7.325
S.SanFrancisco(25) B3 8.075
SparrowsPoint,Md. B2. 7.325
Warren,O. R2 .....7.325
Weirton,W.Va. W6 ....7.325
Youngstown U5, Y1 ....7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..5.175
Warren,O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.15
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland A7, J5 .....7.15
Conshohocken,Pa. A3 ..7.20
Dearborn,Mich. D3 ....7.25
Detroit D2, M1, P20 ....7.25
Dover,O. G6 .....7.15
Ecorse,Mich. G5 .....7.25
Evanston,Ill. M22 .....7.25
Follansbee,W.Va. F4 ....7.15
Fontana,Calif. K1 .....9.00
FranklinPark,Ill. T6 ..7.25
Ind.Harbor,Ind. Y1 ..7.15
Indianapolis J5 .....7.30
LosAngeles J5 .....9.05
LosAngeles C1 .....9.20
NewBedford, Mass. R10 .7.60
NewBritain(10) S15 ....7.15
NewCastle,Pa. B4, E5 ..7.15
NewHaven,Conn. D2 ....7.60
NewKensington,Pa. A6..7.15
Pawtucket,R.I. R3 .....7.80
Pawtucket,R.I. N8 .....7.70
Philadelphia(45) P24 ....7.70
Pittsburgh J5 .....7.15
Riverdale,Ill. A1 .....7.25
Rome,N.Y. (32) R6 ....7.15
Sharon,Pa. S3 .....7.15
Trenton,N.J.(31) R5 ...8.60
Wallingford,Conn. W2 ..7.60
Warren,O. R2, T5 ....7.15
Weirton,W.Va. W6 .....7.15
Worcester,Mass. A7 ....7.70
Youngstown J5, Y1 ....7.15

STRIP, Cold-Rolled Alloy

Boston T6 .....15.40
Carnegie,Pa. S18 .....15.05
Cleveland A7 .....15.25
Dover,O. G6 .....15.05
Farrell,Pa. S3 .....15.05
FranklinPark,Ill. T6 ..15.05
Harrison,N.J. C18 .....15.05
Indianapolis J5 .....15.20
Lowellville,O. S3 .....15.05
Pawtucket,R.I. N8 ....15.40
Riverdale,Ill. A1 .....15.05
Sharon,Pa. S3 .....15.05
Worcester,Mass. A7 ....15.55
Youngstown J5 .....15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn,Mich. D3 ....10.60
Dover,O. G6 .....10.45
Ecorse,Mich. G5 .....10.55
Farrell,Pa. S3 .....10.50
Ind.Harbor,Ind. Y1 ....10.65
Sharon,Pa. S3 .....10.50
Warren,O. R2 .....10.45

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	....	....
Fostoria,O. S1	10.05	11.15	13.10	16.10	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn.(10) S15	8.95	10.40	12.60	15.60	18.55
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.55
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	18.10	21.95	26.30
Buffalo W12	...	18.10	....	....
Fostoria,O. S1	...	18.30	22.15	....
FranklinPark,Ill. T6	...	18.45	22.30	26.65
Harrison,N.J. C18	...	18.10	21.95	26.30
NewYork W3	...	18.10	21.95	26.30
Palmer,Mass. W12	...	18.10	....	....
Trenton,N.J. R5	...	18.10	21.95	26.30
Worcester,Mass. A7, T6	...	18.10	21.95	26.30
Youngstown J5	...	18.45	22.30	26.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover,O. G6 .....7.15*
Evanston,Ill. M22 ....7.25*
Riverdale,Ill. A1 .....7.25*
Warren,O. B9, T5 ....7.15*
Worcester,Mass. A7 ...7.70*
Youngstown J5 .....7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Riverdale, Ill. A1 .....5.50
Sharon,Pa. S3 .....5.35
Youngstown U5 .....5.35

SILICON STEEL

H.R.SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95
Zanesville,O. A10 (SP coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10.	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.825*	11.05*	11.75*	12.85*	....
IndianaHarbor,Ind. I-2	9.625†	10.85*	11.55*	12.65*	....
Mansfied,O. E6	9.625*	11.35	12.05	13.50	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10 (FP coils)	...	11.35	12.05	13.15	14.20

H.R. SHEETS (22Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	14.75	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4.	....	17.60	19.20	19.70	20.20	....
Butler,Pa. A10	....	....	19.20	19.70	20.20	....
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala.T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Irvin,Pa. U5	10.05	10.30
Pitts.Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85
Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.85
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5 .....$7.50
Gary,Ind. U5 .....7.50
GraniteCity,Ill. G4 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Irvin,Pa. U5 .....7.50
Yorkville,O. W10 .....7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5 .....$9.70
Irvin,Pa. U5 .....9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5 .....$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..7.65
Aliquippa,Pa. J5 .....7.65
Alton,Ill. L1 .....7.85
Atlanta A11 .....7.85
Bartonville,Ill. K4 .....7.75
Buffalo W12 .....7.65
Chicago W13 .....7.65
Cleveland A7, C20 .....7.65
Crawfordsville,Ind. M8..7.75
Donora,Pa. A7 .....7.65
Duluth A7 .....7.65
Fairfield,Ala. T2 .....7.65
Fostoria,O.(24) S1 .....7.75
Houston S5 .....7.90
Jacksonville,Fla. M8 ...8.00
Johnstown,Pa. B2 .....7.65
Joliet,Ill. A7 .....7.65
KansasCity,Mo. S5 .....7.90
Kokomo,Ind. C16 .....7.75
LosAngeles B3 .....8.60
Minnequa,Colo. C10 ....7.90
Monessen,Pa. P7, P16 ..7.65
N.Tonawanda,N.Y. B11 7.65
Palmer,Mass. W12 .....7.95
Pittsburg,Calif. C11 ....8.60
Portsmouth,O. P12 .....7.65
Rankin,Pa. A7 .....7.65
S.Chicago,Ill. R2 .....7.65
S.SanFrancisco C10 ....8.60
SparrowsPoint,Md. B2 ..7.75
Sterling,Ill.(1) N15 ....7.65
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....7.65
Waukegan,Ill. A7 .....7.65
Worcester,Mass. A7 ....7.95

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4 ....12.65
Buffao W12 .....12.65
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....12.65
Minnequa,Colo. C10 ...12.775
Monessen,Pa. P16 .....12.65
Muncie,Ind. I-7 .....12.85
NewHaven,Conn. A7 ....12.95
Palmer,Mass. W12 .....12.95
Pittsburg,Calif. C11 ....13.45
Portsmouth,O. P12 .....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt. Md. B2 ...12.75
Struthers,O. Y1 .....12.65
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 .....9.55
LosAngeles B3 .....10.25
Minnequa,Colo. C10 ....9.50
Monessen,Pa. P7, P16 ..9.30
New Haven,Conn. A7 ..9.60
Palmer,Mass. W12 .....9.60
Pittsburg,Calif. C11 ...10.25
Portsmouth,O. P12 .....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ....10.25
SparrowsPt.,Md. B2 ....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,Mass. A7 ....9.60

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....9.30
Alton,Ill. L1 .....9.50
Bartonville,Ill. K4 .....9.40
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora,Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria,O. S1 .....9.35
Johnstown,Pa. B2 .....9.30
KansasCity,Mo. S5 ....9.55
LosAngeles B3 .....10.25
Milbury,Mass.(12) N6 ..9.60
Minnequa,Colo. C10 ....9.55
Monessen,Pa. P7, P16..9.30
Muncie,Ind. I-7 .....9.50
Palmer,Mass.(12) W12 ..9.60
Pittsburg,Calif. C11 ...10.25
Portsmouth,O. P12 .....9.30
Roebling,N.J. R5 .....9.60
S.Chicago,Ill. R2 .....9.30
S.SanFrancisco C10 ....10.25
SparrowsPt.,Md. B2 .....9.40
Struthers,O. Y1 .....9.30
Trenton,N.J. A7 .....9.60
Waukegan,Ill. A7 .....9.30
Worcester,A7, J4, T6 ..9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....15.80
Bartonville,Ill. K4 ....15.70
Buffalo W12 .....15.60
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville,Ind. M8..15.70
Fostoria,O. S1 .....15.60
Houston S5 .....15.85
Jacksonville,Fla. M8 ..15.95
Johnstown,Pa. B2 .....15.60
KansasCity,Mo. S5 ....15.85
Kokomo,Ind. C16 .....15.60
Minnequa,Colo. C10 ....15.85
Monessen,Pa. P7, P16..15.60
Muncie,Ind. I-7 .....15.80
Palmer,Mass. W12 .....15.90
S.SanFrancisco C10 ....16.45
Waukegan,Ill. A7 .....15.60
Worcester,Mass. A7, T6 15.90

ROPE WIRE

Bartonville,Ill. K4 ....12.75
Buffalo W12 .....12.75
Fostoria,O. S1 .....12.75
Johnstown,Pa. B2 .....12.75
Monessen,Pa. P7 .....12.75
Muncie,Ind. I-7 .....12.95
Palmer,Mass. W12 .....13.05
Portmouth,O. P12 .....12.75
Roebling,N.J. R5 .....13.05
SparrowsPt.,Md. B2 ..12.85
Struthers O. Y1 .....12.75
Worcester,Mass. J4 ....13.05
(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

	Col.
Bartonville,Ill. K4	16.55
Monessen,Pa. P16	16.55
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

	Col.
Anderson,Ind. G6	11.65
Baltimore T6	11.95
Boston T6	11.95
Buffalo W12	11.65
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. MS	11.65
Dover,O. G6	11.65
Fostoria,O. S1	11.95
FranklinPark,Ill. T6	11.75
Kokomo,Ind. C16	11.65
Massillon,O. R8	11.65
Milwaukee C23	11.85
Monessen,Pa. P7, P16	11.65
Palmer,Mass. W12	11.95
Pawtucket,R.I. N8	11.95
Philadelphia P24	11.95
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R5	11.95
Warren,O. B9	11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. MS	175
Donora,Pa. A7	173
Duluth A7	173
Houston,Tex. S5	178
Fairfield,Ala. T2	173
Jacksonville,Fla.(20) MS	184
Joliet,Ill. A7	173
Johnstown,Pa. B2	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.95

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. MS	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) MS	186
Joliet,Ill. A7	175
Johnstown,Pa. B2	175
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	9.82
Chicago W13	10.26
Crawfordsville,Ind. MS	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. MS	10.82
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.15
Chicago W13	10.60
Crawfordsville,Ind. MS	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. MS	11.16
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.20
Chicago W13	10.65
Crawfordsville,Ind. MS	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. MS	11.21
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. MS	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. MS	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
Sterling,Ill.(7) N15	214
SparrowsPt.,Md B2	214
Williamsport,Pa. S19	175

FENCE POSTS

	Col.
Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. MS	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston,Tex. S5	198**
Jacksonville,Fla. MS	203
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196*
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198§

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. MS	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston,Tex. S5	192**
Jacksonville,Fla. MS	197
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192§

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa.	J5 17.15	18.95
Bartonville K4	..17.25	19.05
Cleveland A7	...17.15	....
Crawf'dsville MS	17.25	19.05
Fostoria,O. S1	..17.65	19.20†
Houston S5	....17.40	18.95**
Jacksonville MS	17.50	19.30
Johnstown B2	..17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	...17.25	18.80†
Minnequa C10	..17.40	18.95**
P'im'r,Mass.W12	17.45	19.00†
Pitts.,Calif. C11	17.50	19.05†
SparrowsPt. B2	17.25	19.05§
Sterling(37) N15	17.25	19.05§
Waukegan A7	..17.15	18.70†
Worcester A7	...17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	8.65 9.20**
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	8.75 9.425*
Bartonville(48) K4	8.75 9.425
Buffalo W12	8.65 9.20†
Cleveland A7	8.65 ....
Crawfordsville MS	8.75 9.425
Donora,Pa. A7	8.65 9.20†
Duluth A7	8.65 9.20†
Fairfield T2	8.65 9.20†
Houston(48) S5	8.90 9.45**
Jacks'ville,Fla. MS	9.00 9.675
Johnstown B2(48)	8.65 9.325§
Joliet,Ill. A7	8.65 9.20†
Kans.City(48) S5	8.90 9.45**
Kokomo C16	8.75 9.30†
LosAngeles B3	9.60 10.275§
Minnequa C10	8.90 9.45**
Monessen P7(48)	8.65 9.25*
Palmer,Mass. W12	8.95 9.50†
Pitts.,Calif. C11	9.60 10.15†
Rankin,Pa. A7	8.65 9.20†
S.Chicago R2	8.65 9.20**
S.SanFran. C10	9.60 10.15**
Spar'wsPt.B2(48)	8.75 9.425§
Sterling(48) N15	8.90 9.575§
Sterling(1)(48)	8.80 9.475§
Struth'rs,O.(48)	Y1 8.65 9.30‡
Worcester,Mass.A7	8.95 9.50†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)	
½ in. and smaller:	
6 in. and shorter	49.0
Longer than 6 in.	39.0
⅝ in. thru 1 in.:	
6 in. and shorter	39.0
Longer than 6 in.	35.0
1⅛ in. and larger:	
All lengths	35.0
Undersized Body (rolled thread)	
½ in. and smaller:	
6 in. and shorter	49.0

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	29.0
Longer than 6 in.	15.0
⅝ in. and larger:	
All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter	49.0
Longer than 6 in.	39.0

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	49.0
Larger than ½ in. or longer than 6 in.	39.0

Blank Bolts 39.0

Step, Elevator, Tire Bolts 49.0

Stove Bolts, Slotted:

⅛ to ¼-in. incl., 3 in. and shorter	55.0
5/16 to ½ in., inclusive	55.0

NUTS

Reg. & Heavy Square Nuts:
All sizes 55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger	53.5

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	60.5
¾ in. to 1 in., incl.	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	40.0
¾, ⅞ and 1 in. diam.	22.0
Longer than 6 in.:	
⅝ in. and smaller	8.0
¾, ⅞ and 1 in. diam.	+6.0

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	26.0
¾, ⅞ and 1 in. diam.	3.0
Longer than 6 in.:	
⅝ in. and smaller	+13.0
¾, ⅞ and 1 in. diam.	+32.0

Flat Head Capscrews:
¾ in. and smaller +76.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam:

6 in. and shorter	Net
Longer than 6 in.	+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.25
7/16 in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2½	12	46.99	55.06	41.81
2¾	12	51.76	60.65	46.05
3	12	56.04	65.67	49.88
3¼	12	59.76	70.03	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Huntington,W.Va. C15	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	...
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	...
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	...
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	6.60
Gary,Ind. U5	6.60
Ind.Harbor,Ind. I-2	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Seattle B3	6.75
Steelton,Pa. B2	6.60
Torrance,Calif. C11	6.75

JOINT BARS

Bessemer,Pa. U5	6.975
Fairfield,Ala. T2	6.975
Ind.Harbor,Ind. I-2	6.975
Joliet,Ill. U5	6.975
Lackawanna,N.Y. B2	6.975
Minnequa,Colo. C10	6.975
Steelton,Pa. B2	6.975

AXLES

Ind.Harbor,Ind. S13	8.775
Johnstown,Pa. B2	8.775

TRACK BOLTS, Untreated

Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	14.75
Seattle B3	15.25

SCREW SPIKES
Lebanon,Pa. B2 14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	9.75
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	9.75
Seattle B3	10.25
S.Chicago Ill. R2	9.75
Struthers,O. Y1	9.75
Youngstown R2	9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 1000 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 6.045c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(46) Special quality.
(48) 6.7 Ga.
(49) 3½ in. and smaller rounds; 8.65c, over 3½ in. and other shapes.

PERFECT PARTS

by the millions

KEYSTONE XL WIRE STUDY

How KEYSTONE XL Wire turned a problem into a profit for

THE WESTERN AUTOMATIC MACHINE SCREW CO.

DIVISION OF STANDARD SCREW COMPANY—377 WOODLAND AVENUE, ELYRIA, OHIO

This transmission bolt once posed three "impossible" production problems. It used to be cold headed from annealed-in-process, heading quality wire. Almost 100% of the bolts made were rejected because of cracked heads. Die wear was excessive. An objectionable burr was frequently formed, requiring a secondary trimming operation.

Then this progressive firm switched to Keystone "XL" Wire, and all three problems were solved. Perfect bolts are now produced *by the millions.* Dies last longer, due to the excellent coating and surface condition of "XL" Wire. The secondary trimming operation has been eliminated. The bolt is produced on a single stroke boltmaker using 3 position multiple dies with progressive steps to preform, upset and trim.

If you have a problem part to cold head, your Keystone representative will help you analyze it and recommend the wire you need.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY

Keystone Steel & Wire Company
Peoria 7, Illinois

COLD HEADING FACTS FOLDER . . . send coupon today! New folder discusses uses, applications, methods, technical facts, wire requirements.

Name_____ Title_____

Company_____

Street_____

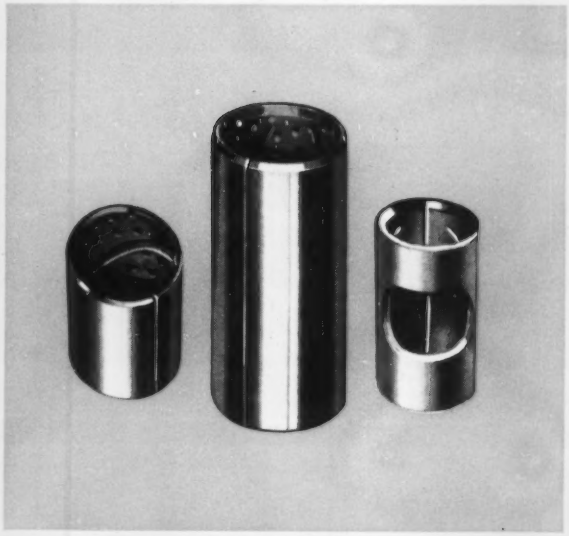
City_____ State_____

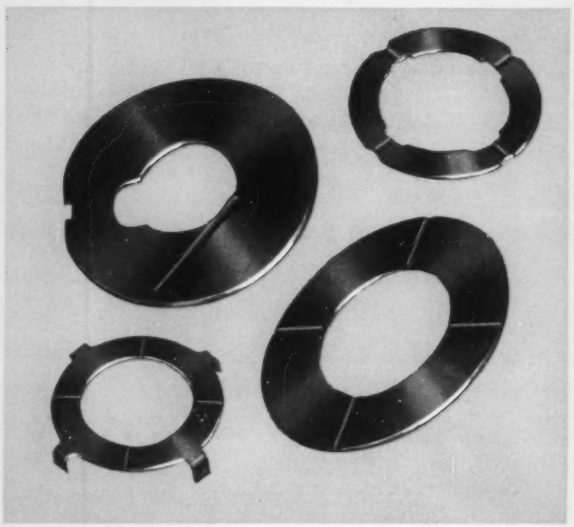
Three alloy linings meet 95% of engine bearing needs

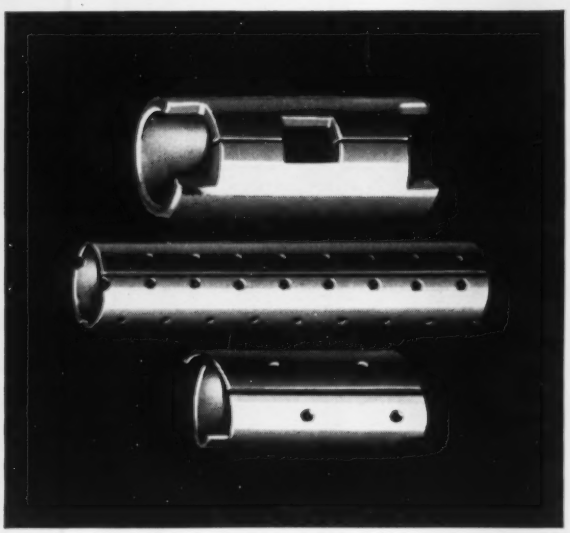
Experience shows a steel back lined with tin- or lead-base babbitt or copper-alloy meets performance requirements.

Bimetal and Plain Bushings offer substantial economies

Rolled split plain bronze, steel or aluminum; or steel lined with bronze, babbitt or copper-alloy. Many design variations possible, plus volume production economies.







Precision Thrust Washers in Bronze or Bronze on Steel

Cold rolled for heavy duty. Steel faced with copper-alloy on one or *both* faces. Nibs, lugs, coined oil grooves. Flat, spherical or special shapes. From 1″ to 6″ O.D.

FEDERAL Mogul SINCE 1899

Economical Spacer Tubes for Hundreds of Applications

Money-saving substitute for iron pipe, tubing or machined parts. Delivered ready for assembly, to exact dimensions—or can be brazed to other components.

FEDERAL-MOGUL DIVISION

FEDERAL-MOGUL-BOWER BEARINGS, INC., 11051 SHOEMAKER, DETROIT 13, MICHIGAN

RESEARCH • DESIGN • METALLURGY • PRECISION MANUFACTURING

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	118.75	....	132.00	138.50	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. C. Carlson Inc.; Charter Wire Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville I.7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%)

W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	....	....	4.170
18.25	4.25	1	4.75	....	....	2.385
18	4	2	9	....	....	2.755
18	4	2	....	....	....	1.845
18	4	1	....	....	....	1.680
9	3.5	..	....	....	....	1.275
13.5	4	3	....	....	....	1.945
13.75	3.75	2	5	....	....	2.325
6.4	4.5	1.9	....	5	....	1.185
6	4	3	....	6	....	1.430
1.5	4	1	....	8.5	....	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	....
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon,Mich., deld.	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,O., deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.10	75.60	....
Newark,N.J., deld.	72.29	72.79	73.29	73.79
Philadelphia, deld.	70.01	70.51	71.01	71.59
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard, O. Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,O., deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	66.50	67.00	67.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,O. I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	78.00
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.27
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13§	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.76	....	8.76	9.06	11.34#	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	10.15	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	....	9.42	9.73	....	15.28	9.63	9.72	11.20
Buffalo	8.25	9.45	11.07	....	8.50	8.80	....	15.00	8.90	8.90	10.45
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	8.20	9.45	10.00	....	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	....	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	....	8.33	8.69	....	14.74	9.01	8.79	10.11
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	....	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95[10]	....	8.50	8.75	9.05[10]	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	9.05	11.10	....	9.10	9.05	10.30
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.50	10.75	11.65	....	9.55	9.70	12.75	16.00	9.60	9.55	11.70
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	....	9.31	9.57	....	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.67	8.65	11.51#†††	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	50.00	8.33	8.60	....	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.20	11.35†‡	8.65	14.65#	15.95	9.60	8.30	12.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.36	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	54.85	9.45	9.70	13.00	16.00	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.20	10.00	10.10	14.05	16.35	9.80	9.70	12.10
Spokane, Wash.	9.95	11.15	12.00	....	10.00	10.10	14.05	17.10	9.80	9.70	12.10
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras, except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **¼ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018; †††item quantity.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; [3]—400 to 9999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St., Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Silica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96.75; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, O., $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry duty paid, metallurgical grade: European, $33-34; Mexican, all-rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	30.00

Tungsten Ore

Net ton, unit, before duty

Foreign wolframite, good commercial quality	13.75-14.25
Domestic, concentrates mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.35-$1.45 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, $1.35-$1.45; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$55.00-58.00
48% 2.8:1	52.00-55.00
48% no ratio	46.00-48.00

South African Transvaal

48% no ratio	$40.00-41.00
44% no ratio	30.00-31.00

Turkish

48% 3:1	$59.00-62.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.90-3.30
60-65%	3.30-3.60

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over.. F.o.b. Riverton or Camden, N. J., west of Mississippi River.	9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over F.o.b. Riverton, N. J., west of Mississippi River	10.50 / 9.50
Sponge Iron, Canadian: F.o.b. shipping point	9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500 lb drum, frght allowed Carlots	39.50
Ton lots	41.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	32.00-39.70†
Bronze, 5000-lb lots	49.50-54.10†
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.15
Nickel-Silver, 5000-lb lots	50.20-54.80†
Phosphor-Copper, 5000-lb lots	61.30
Copper (atomized) 5000-lb lots	41.80-50.30‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.02
Stainless Steel, 316	$1.20
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡
Tungsten: Melting grade, 99% 60 to 2000 mesh: 1000 lb and over	Dollars 3.75
Less than 1000 lb	3.90
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5½	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.30	$6.25	$6.25	$6.50
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.35	8.30	8.30	8.60
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (§)	8.38	8.38	8.38	8.58

†Per 82 lb, net, reel. §Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, pre gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net tons; $225, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Managanese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5c max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb of contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 20.85c. per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk, 42.35c. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less caarload lot, packed $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13c per lb of contained Si. Packed c.l. 15.5c, ton lot 16.95c, less ton 18.6c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contact, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 20.00c per lb of Si. Packed, cl. 21.65c, ton lot 22.95c, less ton 23.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (1 to 2%). Contract, lump, carload 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUTTED ALLOYS

Chromium Briquets: (Weighing approx 3% lb each and containing 2 lb of Cr). Contract, carload, bulk 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

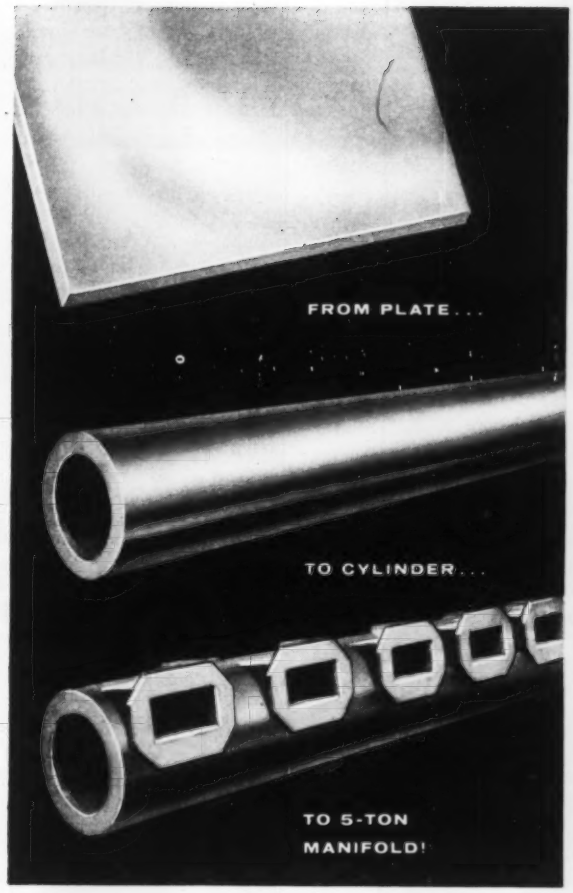
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.



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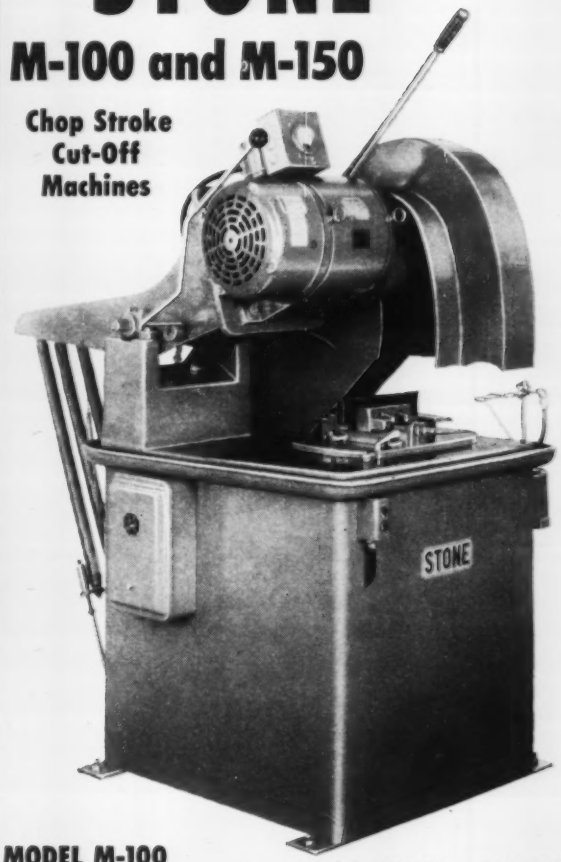

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Scrap Prices Still Going Down

Lack of buying interest depresses market further. STEEL's composite on the prime grade drops another $2 to $48.17, lowest level reported since last May

Scrap Prices, Page 178

Pittsburgh — Declines averaged $2 per ton last week. Although prices are largely nominal because of slack sales, No. 1 heavy melting scrap can probably be purchased for $50 a ton now. Punchings, plate scrap, and turnings are expected to drop next week.

Leading grades of railroad scrap are off, while some cast iron grades are stronger. A steel mill bought 18-8 bundles and solids for $235 a ton last week, down $15 from the previous price.

Philadelphia — Prices are off sharply on small-lot buying. Practically all grades are $2 to $4 a ton lower, No. 2 heavy melting and turnings taking the largest drop. Buying for export is active; two vessels are loading at this port. Prices paid for export tonnage are $2 to $3 over domestic quotations, and the bulk of the movement from nearby yards is for dock delivery.

New York — Steel scrap prices are sagging on small volume new buying. The sharpest break is in No. 2 bundles, brokers' buying price being off $5 a ton. Machine shop turnings are down $3, but borings and turnings are nominal in the absence of buying. Some steel scrap is being bought for export, most tonnage being within $2 to $3 freight to dock. Cast grades are lower, on the average about $1 a ton. Stainless steel scrap buying is slow, and the 18-8 grades are off another $10 a ton.

Boston—No. 1 heavy melting steel declined another $1 a ton and No. 2 bundles $2. Brokers are paying $29-$30, shipping point, for No. 2 bundles. Borings and turnings are slow, and prices are nominal in the absence of a buying test.

Chicago—Scrap market weakness continues here with leading steelmaking grades down $1 to $2 a ton. Since early August the principal grades are off as much as $7 a ton. Further declines are a strong possibility. Only one mill has been a consistent buyer, others purchasing irregularly and sparingly.

The five-day strike at the Indiana Harbor Works of Youngstown Sheet & Tube Co. halted blast furnace and steelmaking operations there. It was estimated the plant was consuming 1200 tons of purchased scrap daily when the strike was called.

Another strike, involving 150 crane operators at the Gadsden, Ala., plant of Republic Steel Corp., closed that works for about two days, idling some 5000 workers.

Detroit — Scrap prices tumbled again here as the local market ad-

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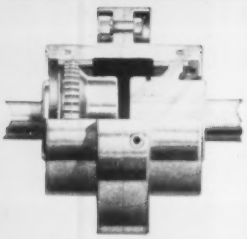

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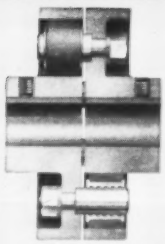

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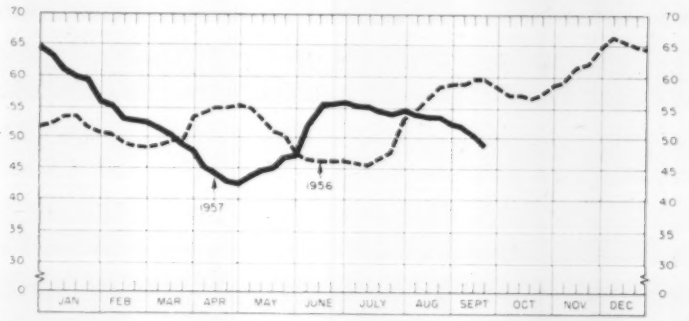
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania—Compiled by STEEL



Sept. 18 1957	Week Ago	Month Ago	Year Ago	Aug. Avg.
$48.17	$50.17	$53.50	$59.67	$53.33

justed to levels in line with those in other areas. The latest flurry of activity was in bundles and turnings, which slipped off several dollars a ton. The foundry grades are participating in the decline, although there is little activity in this area of demand.

Cleveland—There is practically no buying in the local market, but tonnage continues to move on old orders. The market undertone is weak, and prices on the steelmaking grades are off another $1 a ton, though the list is largely nominal in the absence of a representative buy.

Youngstown—The scrap market continues in the doldrums. There is little buying, and local mills appear to be well supplied.

Buffalo—A decline of $2 a ton in cast scrap features the local market. A small sale of cupola cast was made at $47, compared with a previous price of $49. The price on No. 1 machinery cast also dropped $2, being quoted at $52.

Cincinnati—Prices are off $1 to $3 a ton in a slow market. No. 1 heavy melting is quoted $48-$49, brokers' buying price. No. 2 bundles fell $3, following the placing of limited orders by a local consumer.

St. Louis — The scrap market here continues weak and prices are steadily softening. Most grades have been marked down another $1 to $3 a ton.

Birmingham—Further weakness developed in the scrap market here last week, particularly in the electric furnace grades. Open-hearth scrap consumers either are out of the market, or are buying sparingly. Purchases by a few of the larger foundries are keeping cast prices steady, but this segment of the market also appears easy.

Seattle—Scrap is moving at the slowest pace in months. Sales volume is down, but dealers expect improvement within 30 days. The mills hold large inventories and are buying sparingly. Prices are unchanged.

San Francisco — Demand for steel scrap here is slow. Material also is moving slowly to the market. The price undertone remains weak in the absence of exports to Japan—a strong bulwark earlier this year.

Warehouse . . .

Warehouse Prices, Page 172

The volume of business booked by distributors so far this month has been slightly better than the July-August average, but it is not as large as had been expected at most points.

Demand from the construction industry continues to be good, but most other users continue to reduce their inventories by restricting new purchases. The automotive industry has not come into the market for the large tonnages that are normal at this time of year.

Sales of sheets and cold-drawn bars are poor and are only moderate for hot-rolled bars and light plates. Distributors have well rounded stocks of plates except in some heavy, wide sizes. Wide flange beams are the only critically short item in most districts.

Prices are firm in all districts except Portland, Oreg., where price cutting is reported.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4160 tons, 12-story hospital, Great Lakes Training Station, Great Lakes, Ill., to Allied Structural Steel Co., Chicago; T. C. Bateson Construction Co., Dallas, general contractor.

3000 tons, office building, National Life Insurance Co., Montpelier, Vt., to Vermont Structural Steel Co., Burlington, Vt.; Gilbane Building Corp., Providence, R. I., general contractor.

1355 tons, plate girder bridge, Merrimack River, Concord, N. H., to American Bridge Div., U. S. Steel Corp., Pittsburgh; Monroe & Langstroth Co., Boston, general contractor.

620 tons, including 80 tons, joists, high school, Pontiac, Mich., to Overhead Conveyor Co., Ferndale, Mich.; Spence Bros., Saginaw, Mich., general contractor.

550 tons, test and qualification building, Redstone Arsenal, Huntsville, Ala., to Bibb Steel & Supply Co., Macon, Ga.; Batson-Cook Co., West Point, Ga., general contractor.

500 tons, state highway bridges, Wilmington-Woburn-Reading, Mass., to Tower Iron Works, Providence, R. I.; Campanella & Cardi Construction Co., Hillsgrove, R. I., general contractor.

300 tons, buildings and utilities, AFS, Bucks Harbor, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Consolidated Constructors Inc., Portland, Maine, general contractor.

270 tons, high school, Vernon, Conn., to Haarmann Steel Co., Holyoke, Mass.; A. F. Peaslee Inc., Hartford, Conn., general contractor; reinforcing Bars, U. S. Steel Supply Div., U. S. Steel Corp.

170 tons, craneway reinforcing, General Electric Co., Lynn, Mass., to A. O. Wilson Structural Co., Cambridge, Mass.

140 tons, Garfield Street crossing, Seattle, to the Bethlehem Pacific Coast Steel Corp., Seattle; MacRae Bros., Seattle, general contractor.

STRUCTURAL STEEL PENDING

1875 tons, Washington State Hood Canal floating bridge; bids to Olympia, Wash., Oct. 15; project also involves 185 tons of bolts and washers, 115 tons of machinery, 20,150 sq ft of steel decking, 5844 ft of steel pipe, and 2450 ft of steel piling.

175 tons, Washington State Skagit County steel girder bridge; general contract to Louis Elterich Co. and Del Guzzi, Port Angeles, Wash., joint low and awarded at $470,536.

(*Please turn to Page* 183)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Sept. 18, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Sept. 18	$48.17
Sept. 11	50.17
Aug. Avg	53.33
Sept. 1956	59.08
Sept. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*49.00-50.00*
No. 2 heavy melting	43.00-44.00
No. 1 factory bundles	*57.00-58.00*
No. 1 dealer bundles	*49.00-50.00*
No. 2 bundles	*38.00--39.00*
No. 1 busheling	*49.00-50.00*
Machine shop turnings	*29.00-30.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*32.00-33.00*
Cast iron borings	*32.00-33.00*
Cut structurals:	
2 ft. and under	*57.00-58.00*
3 ft length	*56.00-57.00*
Heavy turnings	*45.00-46.00*
Punchings & plate scrap	*56.00-57.00*
Electric furnace bundles	*56.00-57.00*

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Stove plate	42.00-43.00
Unstripped motor blocks	*33.00-34.00*
Clean auto cast	49.00-50.00
Drop broken machinery	*57.00-58.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*54.00-55.00*
Rails, 2 ft and under	71.00-72.00
Rails, 18 in. and under	72.00-73.00
Angles, splice bars	61.00-62.00
Rails, rerolling	*70.00-71.00*

Stainless Steel Scrap

18-8 bundles & solids	*225.00-235.00*
18-8 turnings	*125.00-135.00*
430 bundles & solids	80.00-85.00
430 turnings	55.00-60.00

CLEVELAND

No. 1 heavy melting	*48.00-49.00*
No. 2 heavy melting	*39.00-40.00*
No. 1 factory bundles	*53.00-54.00*
No. 1 bundles	*48.00-49.00*
No. 2 bundles	*38.00-39.00*
No. 1 busheling	*48.00-49.00*
Machine shop turnings	*20.00-21.00*
Short shovel turnings	*24.00-25.00*
Mixed borings, turnings	*24.00-25.00*
Cast iron borings	*24.00-25.00*
Cut foundry steel	*48.00-49.00*
Cut structurals, plates 2 ft and under	*55.00-56.00*
Low phos. punchings & plate	*49.00-50.00*
Alloy free, short shovel turnings	*27.00-28.00*
Electric furnace bundles	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	49.00-50.00
Charging box cast	39.00-40.00
Heavy breakable cast	37.00-38.00
Stove plate	46.00-47.00
Unstripped motor blocks	33.00-34.00
Brake shoes	37.00-38.00
Clean auto cast	50.00-51.00
Burnt cast	35.00-36.00
Drop broken machinery	52.00-53.00

Railroad Scrap

No. 1 R.R. heavy melt.	51.00-52.00
R.R. malleable	59.00-60.00
Rails, 2 ft and under	71.00-72.00
Rails, 18 in. and under	72.00-73.00
Rails, random lengths	64.00-65.00
Cast steel	62.00-63.00
Railroad specialties	64.00-65.00
Uncut tires	59.00-60.00
Angles, splice bars	64.00-65.00
Rails, rerolling	69.00-70.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	230.00-240.00
18-8 turnings	130.00-140.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*51.00-52.00*
No. 2 bundles	*40.00-41.00*
No. 1 busheling	*51.00-52.00*
Machine shop turnings	21.00-22.00
Short shovel turnings	27.00-28.00
Cast iron borings	27.00-28.00
Low phos.	*53.00-54.00*
Electric furnace bundles	*53.00-54.00*

Railroad Scrap

No. 1 R.R. heavy melt.	54.00-55.00

CHICAGO

No. 1 heavy melt., indus.	*51.00-52.00*
No. 1 hvy melt., dealer	*47.00-48.00*
No. 2 heavy melting	*40.00-41.00*
No. 1 factory bundles	*54.00-55.00*
No. 1 dealer bundles	*49.00-50.00*
No. 2 bundles	*36.00*
No. 1 busheling, indus.	*51.00-52.00*
No. 1 busheling, dealer	*47.00-48.00*
Machine shop turnings	*28.00-29.00*
Mixed borings, turnings	*30.00-31.00*
Short shovel turnings	*30.00-31.00*
Cast iron borings	*30.00-31.00*
Cut structurals, 3 ft	*52.00-53.00*
Punchings & plate scrap	*53.00-54.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	42.00-43.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	49.00-50.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	*53.00-54.00*
R.R. malleable	58.00-59.00
Rails, 2 ft and under	66.00-67.00
Rails, 18 in. and under	67.00-68.00
Angles, splice bars	*60.00-61.00*
Axles	*64.00-65.00*
Rails, rerolling	*64.00-65.00*

Stainless Steel Scrap

18-8 bundles & solids	225.00-235.00
18-8 turnings	125.00-135.00
430 bundles & solids	90.00-100.00
430 turnings	60.00-70.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*30.00-31.00*
No. 1 busheling	*43.00-44.00*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*24.00-25.00*
Short shovel turnings	*26.00-27.00*
Punchings & plate scrap	*49.00*

Cast Iron Grades

No. 1 cupola	*48.00*
Stove plate	44.00
Charging box cast	44.00
Heavy breakable	43.00
Unstripped motor blocks	*33.00*
Clean auto cast	*49.00*
Malleable	*51.00†*

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*46.00*
No. 2 heavy melting	*43.00*
No. 1 bundles	*46.00*
No. 2 bundles	*37.00*
No. 1 busheling	*46.00*
Machine shop turnings	*30.00*
Short shovel turnings	32.00

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	*42.00*
Heavy breakable cast	*42.00*
Unstripped motor blocks	*42.00*
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	*52.00*
Rails, 18 in. and under	*69.00*
Rails, random lengths	*60.00*
Rails, rerolling	*70.00*
Angles, splice bars	59.00

PHILADELPHIA

No. 1 heavy melting	*45.50*
No. 2 heavy melting	*40.00*
No. 1 bundles	*46.50*
No. 2 bundles	*36.50*
No. 1 busheling	*46.50*
Electric furnace bundles	*50.00*
Mixed borings, turnings	*28.00*
Short shovel turnings	*30.00*
Machine shop turnings	*26.00*
Heavy turnings	*41.50*
Structural & plate	54.00-55.00
Couplers, springs, wheels	*63.50*
Rail crops, 2 ft & under	69.00-71.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Heavy breakable cast	*50.50*
Malleable	*61.00*
Drop broken machinery	56.00-57.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*30.00-31.00*
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*18.00-19.00*
Low phos. (structural & plate	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Unstripped motor blocks	*38.00-39.00*
Heavy breakable	*44.00-45.00*

Stainless Steel

18-8 sheets, clips, solids	*190.00-200.00*
18-8 borings, turnings	*90.00-100.00*
430 sheets, clips, solids	65.00-75.00
410 sheets, clips, solids	50.00-55.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	38.00-39.00
No. 2 heavy melting	*32.00-33.00*
No. 1 bundles	38.00-39.00
No. 2 bundles	*29.00-30.00*
No. 1 busheling	38.00-39.00
Machine shop turnings	18.00-18.50
Mixed borings, turnings	19.00-19.50
Short shovel turnings	20.00-21.00
No. 1 cast	33.00-34.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	41.00-42.00

BUFFALO

No. 1 heavy melting	47.00-48.00
No. 2 heavy melting	40.50-41.50
No. 1 bundles	47.00-48.00
No. 2 bundles	37.50-38.50
No. 1 busheling	47.00-48.00
Mixed borings, turnings	31.00-32.00
Machine shop turnings	29.00-30.00
Short shovel turnings	32.00-33.00
Cast iron borings	33.00-34.00
Low phos.	53.00-54.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*46.00-47.00*
No. 1 machinery	*51.00-52.00*

Railroad Scrap

Rails, random lengths	61.00-62.00
Rails, 3 ft and under	66.00-67.00
Railroad specialties	59.00-60.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	48.00-49.00
No. 2 heavy melting	*42.00-43.00*
No. 1 bundles	*48.00-49.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*48.00-49.00*
Machine shop turnings	30.00-31.00
Mixed borings, turnings	26.00-27.00
Short shovel turnings	33.00-34.00
Cast iron borings	26.00-27.00
Low phos. 18 in.	*55.00-56.00*

Cast Iron Grades

No. 1 cupola	*43.00-44.00*
Heavy breakable cast	*39.00-40.00*
Charging box cast	*39.00-40.00*
Drop broken machinery	*52.00-53.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*50.00-51.00*
Rails, 18 in. and under	*70.00-71.00*
Rails, random lengths	*63.00-64.00*

BIRMINGHAM

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	36.00-37.00
No. 1 bundles	46.00-47.00
No. 2 bundles	*29.00-30.00*
No. 1 busheling	46.00-47.00
Cast iron borings	27.00-28.00
Short shovel turnings	*33.00-34.00*
Machine shop turnings	*31.00-32.00*
Bar crops and plates	*52.00-53.00*
Structurals & plate	*51.00-52.00*
Electric furnace bundles	*47.00-48.00*
Electric furnace:	
3 ft and under	*45.00-46.00*
2 ft and under	*46.00-47.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	54.00-55.00
Stove plate	54.00-55.00
Unstripped motor blocks	44.00-45.00
Charging box cast	37.00-38.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*50.00-51.00*
Rails, 18 in. and under	*59.00-60.00*
Rails, rerolling	62.00-63.00
Rails, random lengths	*53.00-54.00*
Angles, splice bars	*55.00-56.00*

SEATTLE

No. 1 heavy melting	42.00
No. 2 heavy melting	40.00
No. 1 bundles	40.00
No. 2 bundles	29.00
Machine shop turnings	27.00
Mixed borings, turnings	27.00
Electric furnace No. 1	48.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	35.00
Unstripped motor blocks	30.50
Stove plate (f.o.b. plant)	28.00

LOS ANGELES

No. 1 heavy melting	*46.00*
No. 2 heavy melting	*44.00*
No. 1 bundles	*45.00*
No. 2 bundles	*35.00*
Machine shop turnings	*35.00*
Shoveling turnings	*32.00*
Cast iron borings	*31.00*
Cut structural and plate, 1 ft and under	*60.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*52.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*46.00*

SAN FRANCISCO

No. 1 heavy melting	44.00
No. 2 heavy melting	42.00
No. 1 bundles	43.00
No. 2 bundles	*35.00*
Machine shop turnings	30.00
Mixed borings, turnings	30.00
Cast iron borings	30.00
Heavy turnings	30.00
Short shovel turnings	30.00
Cut structurals, 3 ft	*50.00*

Cast Iron Grades

No. 1 cupola	*52.00*
Charging box cast	*45.00*
Stove plate	46.00
Heavy breakable cast	40.00
Unstripped motor blocks	*40.00*
Clean auto cast	*52.00*
No. 1 wheels	*45.00*
Drop broken machinery	*52.00*

HAMILTON, ONT.

No. 1 heavy melting	50.00
No. 2 heavy melting	45.00
No. 1 bundles	50.00
No. 2 bundles	39.00
Mixed steel scrap	47.00
Mixed borings, turnings	24.00
Busheling, new factory:	
Prepared	50.00
Unprepared	44.00
Short steel turnings	30.00
Rails, rerolling	61.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

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Copper Shows Some Gains

Custom smelters raise prices 1 cent, but fluctuations in London and continued overproduction keep market uncertain. Lead and zinc still stable both here and abroad

Nonferrous Metal Prices, Pages 182 & 183

COPPER PRICES have shown some unexpected strength recently, raising hopes in many quarters that the primary quotation (27 cents a pound) may not go any lower.

Pickups—The recent upturn in foreign quotations encourged custom smelters to boost their prices by 0.5 cent a pound on Sept. 12. On Sept. 13, custom smelters again raised their price 0.5 cent to 26 cents a pound because of a buying flurry that resulted from the first price increase. But custom smelters report sales are little better than they were before the increase.

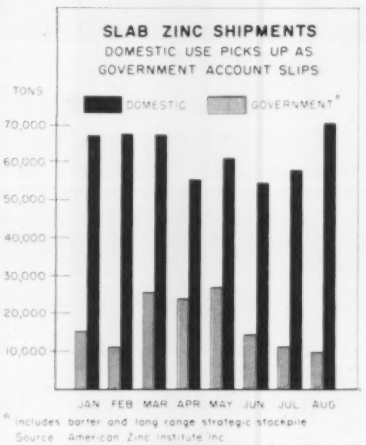
Stabiliation of the domestic price will probably hinge on how well foreign quotations hold up, say metalsmen. On Sept. 17, the London Metal Exchange was quoting close to 24.4 for primary (add 0.75 cent a pound for freight, delivered New York), a downward fluctuation from the previous week. On the same day, the Rhodesian Selection Trust stood at 25 cents a pound and Katanga copper was at 25.5 cents a pound, c.i.f., New York.

No one in the copper business is saying prices both here and abroad won't go down. But there are mild tones of optimism in the market. Examples: Several observers see custom smelted copper going up another 0.5 to 0.75 cent a pound shortly. Many feel the price of primary may have hit bottom, too; some even predict a 1 to 2 cent a pound rise within a few weeks.

Unchanged—Regardless of the other economic factors, copper's big problem still remains overproduction. Consumption hasn't declined as much this year as the falling price pattern would indicate.

Statistics just released by the Copper Institute show that world refined production of copper was 232,169 tons in August, a slight fall from the July total of 239,365 tons.

On the domestic scene, refined production showed a slight increase: 127,434 tons in July, 128,480 tons in August. Stocks went up, too—they totaled 191,515 tons in July and 192,931 tons in August. But the real jump came in domestic deliveries to fabricators which rose from 84,702 tons in July to 107,522 tons in August.



Cutting?—The expected rash of production curtailments hasn't arrived, but many industry observers say it's only a matter of time. Three developments: 1. Calumet & Hecla Inc. will suspend operations at several of its mines and concentrate facilities in the Michigan area. 2. The Chilean government is closing some marginal mines which have an average production of 35,000 tons a year. 3. Phelps Dodge Corp. cut output of its Arizona open pit mines another 5 per cent, bringing total cuts to 3500 tons a month so far. Previously, Anaconda Co. had cut domestic operations by 3000 tons a month.

Lead and Zinc Steady

Producers report sales are fair. Zinc buying has slacked off a little from the August flurry, but sales are still better than they were in June and July.

The price of both metals appears stable. Lead has been hovering at over 11 cents on the London Metal Exchange (add 1.85 cents a pound for freight and duty, delivered New York); zinc is staying near the 9.5 cents a pound figure (add 1.5 cents for duty and freight). Producers see little likelihood of a price upturn until the government takes some action on the proposed tariffs.

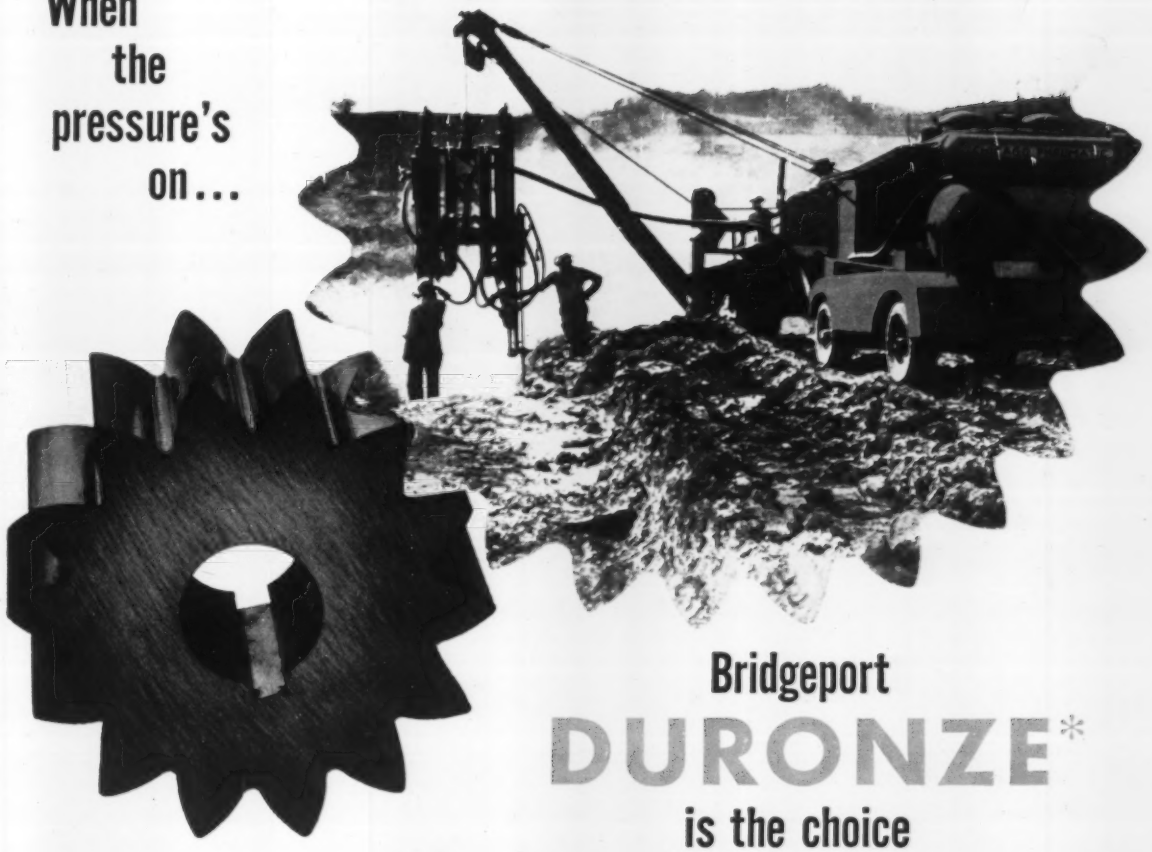
American Zinc Institute Inc. reports production in August was 84,166 tons, a slight decrease from July's 85,779 tons. Domestic shipments were 57,862 tons in July and hit 70,318 tons in August (see chart). But stocks rose over 3000 tons in this period—now stand at 149,296.

NONFERROUS PRICE RECORD

	Price Sept. 18	Last Change	Previous Price	Aug. Avg	July Avg	Sept., 1956 Avg
Aluminum ..	28.10	Aug. 1, 1957	27.10	28.100	27.100	27.100
Copper	26.00-27.00	Sept. 12, 1957	25.50-27.00	28.639	28.822	39.500
Lead	13.80	June 11, 1957	14.80	13.800	13.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	94.125	Sept. 18, 1957	93.75	94.259	96.576	103.745
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

When the pressure's on...



Bridgeport DURONZE* is the choice

*Aluminum Silicon Bronze

Superior wear resistance and good machinability make Bridgeport Duronze 707 (Aluminum Silicon Bronze) an ideal material for many products.

Take, for example, its use by Chicago Pneumatic Tool Co., New York, N. Y., in the oil pump gears used in their rotary portable and stationary Class "P" compressors.

These gears pump the lubricating oil which seals rotary compressor vane clearances, lubricates vital parts and also cools the air during compression. In meeting the precise requirements of this job, Duronze's combination of high strength, wear resistance and machinability are equally important advantages.

In the annealed condition, in which it is generally supplied, Duronze has an average tensile strength of 90,000 lbs. per square inch. Its endurance limit is over twice that of Naval Brass and it is generally superior in corrosion and wear resistance.

Duronze is only one of Bridgeport's complete line of copper and brass alloys in sheet, rod, wire and tube, designed to help you meet a wide variety of product and production applications better, faster and more economically. To help you in choosing the right alloy for your specific needs, you can expect and get experienced assistance from your Bridgeport Salesman and from the Technical Staff behind him. For prompt service, give your local Bridgeport Sales Office a call today.

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Bridgeport Brass Company, Bridgeport 2, Connecticut
In Canada: Noranda Copper and Brass Limited, Montreal

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100-lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 27.00 deld.; custom smelters, 26.00; lake, 27.00 deld.; fire refined, 26.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $86-110 nom. per troy oz.

Lead: Common, 13.80; chemical, 13.90; corroding, 13.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $245-250 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz, nom.

Palladium: $21-24 per troy oz.

Platinum: $81-87 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $10.50 per lb, commercial grade.

Silver: Open market, 90.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55, per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 94.125.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.50 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.10-4.20.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50.East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.75-30.25; No. 12 foundry alloy (No. 2 grade), 21.75-23.00; 5% silicon alloy, 0.60 Cu max., 25.50-26.00; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 24.75-26.75; 108 alloy, 22.25-23.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.00; grade 3, 20.75; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 27.75; tin bronze, No. 225, 37.00; No. 245, 31.25; high-leaded tin bronze, No. 305, 31.75; No. 1 yellow, No. 405, 22.50; manganese bronze, No. 421, 25.50

Magnesium Alloy Ingot: AZ63A, 40.75; AZ91B, 37.25; AZ91C, 40.75; AZ92A, 40.75.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.82, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 32.355; l.c.l., 32.98. Weatherproof, 30,000-lb lots, 33.66; l.c.l., 34.78. Magnet wire deld., 40.43, before quantity discount.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.50 per cwt; pipe, full coils, $19.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates, 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.017	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	45.40	51.20
6061-T6	46.90	53.00
2024-T4*	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.40	....	....
0.188	66.20	63.40	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.547	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Thread plate, .188 in., 71.70; .250-2.00 in., 70.60. Tooling plates, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 6.50-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	49.13b	46.36c	....	49.32
Yellow Brass	43.02	31.30d	43.56	45.93
Low Brass, 80%	45.50	45.44	46.04	48.31
Red Brass, 85%	46.37	46.31	46.91	49.18
Com. Bronze, 90%	47.78	47.72	48.32	50.34
Manganese Bronze	51.01	45.11	55.61	....
Muntz Metal	45.39	41.20	....	....
Naval Brass	47.27	41.58	54.33	50.68
Silicon Bronze	53.76	52.95	53.80	55.74e
Nickel Silver, 10%	59.43	61.75	61.75	....
Phos. Bronze, A-5%	68.07	68.57	68.57	69.75

SCRAP ALLOWANCES f

	Clean Heavy	Rod Ends	Clean Turnings
Copper	23.000	23.000	22.250
Yellow Brass	17.375	17.125	15.750
Low Brass, 80%	19.500	19.250	18.750
Red Brass, 85%	20.250	20.000	19.500
Com. Bronze, 90%	21.000	20.750	20.250
Manganese Bronze	16.125	15.875	15.375
Muntz Metal	16.375	16.125	15.625
Naval Brass	16.125	15.875	15.375
Silicon Bronze	22.625	22.375	21.625
Nickel Silver, 10%	23.625	23.375	11.813
Phos. Bronze, A-5%	23.750	23.500	22.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.00.

Copper and Brass: No. 1 heavy copper and wire, 17.75-18.25; No. 2 heavy copper and wire, 16.25-16.75; light copper, 14.25-14.75; No. 1 composition red brass, 16.00-16.50; No. 1 composition turnings, 15.50-16.00; yellow brass turnings, 9.50-9.75; new brass clippings, 14.00-14.50; light brass, 10.00-10.50; heavy yellow brass, 12.00-12.50; new brass rod ends, 13.00-13.50; auto radiators, unsweated, 12.50-13.00; cocks and faucets, 13.00-13.50; brass pipe, 13.50-14.00.

Lead: Heavy 9.50-10.00; battery plates, 4.25-4.50; linotype and stereotype, 11.50-12.00; electrotype, 10.00-10.50; mixed babbitt, 11.00-11.50.

Monel: Clippings, 35.00-40.00; old sheets, 33.00-38.00; turnings, 24.00-30.00; rods, 35.00-40.00.

Nickel: Sheets and clips, 50.00-55.00; rolled anodes, 50.00-55.00; turnings, 45.00-50.00; rod ends, 50.00-55.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.50; 3003 clippings, 16.50-17.50; 6151 clippings, 16.00-17.50; 5052 clippings, 16.00-17.00; 2014 clippings, 15.50-17.00; 2017 clippings, 15.50-17.00; 2024 clippings, 15.50-17.00; mixed clippings, 15.00-16.00; old sheets, 13.00-13.50; old cast, 13.00-13.50; clean old cable (free of steel), 16.00-16.50; borings and turnings, 13.50-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.00; light scrap, 48.00; turnings and borings, 33.00.

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 20.00; light copper, 17.75; refinery brass (60% copper) per dry copper content, 19.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 20.00; light copper, 17.75; No. 1 composition borings, 18.25; No. 1 composition solids, 18.75; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 14.40.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 45.29; oval, 43.50, 5000-10,000 lb; electrodeposited, 35.75, 2000-5000 lb lots; cast, 36.25, 5000-10,000 quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00 Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 112.50; 200-499 lb, 111.00; 500-999 lb, 110.50; 1000 lb or more, 110.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30, f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 74.80; 300-900 lb, 72.80.

Copper Sulphate: 100-1900 lb, 14.55; 2000-5900 lb, 12.55; 6000-11,900 lb, 12.30; 12,000-22,900 lb, 12.05; 23,000 lb or more, 11.55.

Nickel Chloride: Less than 400 lb, 35.00; 400-9990 lb, 33.00; 10,000 lb, 32.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 75.20; 100-600 lb, 66.20; 700-1900 lb, 63.50; 2000-9900 lb, 61.60; 10,000 lb or more, 60.30.

Stannous Chloride (anhydrous): Less than 25 lb, 164.70; 25 lb, 129.70; 100 lb, 114.70; 400 lb, 112.20; 5200-19,600 lb, 100.00; 20,000 lb or more, 87.80.

Stannous Sulphate: Less than 50 lb, 127.50; 50 lb, 97.50; 100-1900 lb, 95.50; 2000 lb or more, 93.50.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

FOR SALE

Model 1A Kane & Roach 20 Roll Straightening Machine, complete with rolls, Flying Cut-Off, and 20′ Run Out Table. Capacity 7/16″ to 7/8″ bars. Machine new in 1952. Condition like new.

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FRANKLIN ROAD
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Superintendent for large ore crushing, screening and sintering operation in Great Lakes district. Should have heavy operating and maintenance experience. Salary open.

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Penton Bldg. Cleveland 13, Ohio

CLASSIFIED

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Accounts Wanted

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Positions Wanted

SALES ENGINEER, TOOL STEEL AND specialty steels, fifteen years experience with one firm. Prefer New Jersey, New York, Connecticut territory. Reply Box 596, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Positions Wanted" set solid, 50 words or less $15.00, each additional word .30; all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40, each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14, all capitals, 25 words or less $4.50, each additional word .18; all capital leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

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Sodium Hydride Descaling Equipment

Descaling tank, working area 56″ x 18″ x 18″, gas fired immersion heaters, Brown recording controller. Ammonia dissociator with vaporizer, indicating temperature controller. Acid tank 3′ x 6′ x 3′ brick lined, graphite plate heater. Used less than 1 year for experimental production.

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FOR SALE

PRODUCTION WELDERS

A. C. Transformer Type

3—1000 Amp. Westinghouse "Flex-Arc" with Built in Capacitors, Type WC, 1 Ph., 60 Cycle, 440 Volt
Price $750.00 Ea.

1—750 Amp. DITTO, 220/440 Volts
Price $650.00

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(*Concluded from Page 177*)

REINFORCING BARS . . .

REINFORCING BARS PLACED

1200 tons, hospital building, Great Lakes Training Center, Great Lakes, Ill., to Ceco Steel Products Co., Chicago; T. C. Bateson Construction Co., Dallas, general contractor.

270 tons, high school, Pontiac, Mich., to Pollak Steel Co., Cincinnati; Spence Bros., Saginaw, Mich., general contractor.

450 tons, estimated, warehouses and facilities, Olmstead AFB, Middletown, Pa., to Sweet's Steel Co., Williamsport, Pa.; Ritter Bros., Harrisburg, Pa., general contractor.

270 tons, pavement and substructure, Connecticut River bridge, Windsor Locks-East Windsor, to Scherer Steel Co., East Hartford; M. A. Gammino Construction Co., Providence, R. I., general contractor.

450 tons, state highway bridges, Wilmington-Woburn-Reading, Mass., to Plantations Steel Co., Providence, R. I.; Campanella & Cardi Construction Co., Hillsgrove, R. I., general contractor.

200 tons, including structurals, high school, Warren, R. I., to Plantations Steel Co., Providence, R. I.; Donatelli Building Co. Inc., North Providence, R. I., general contractor; 85 tons, structurals, Providence Steel & Iron Co.

250 tons, a 527-ft steel truss span, Rogue River, Oregon, to Poole, McGonigle & Dick, Portland, Oreg.; Tom Lillebo, Reedsport, Oreg., general contractor, low at $243,454 to the Bureau of Public Roads.

190 tons, test building, Redstone arsenal, Huntsville, Ala., to Conners Steel Div., H. K. Porter Company Inc., Birmingham; Batson-Cook Co., West Point, Ga., general contractor.

115 tons, bridge near Forks, Wash., for the Bureau of Public Roads, to an unstated fabricator.

100 tons, buildings and facilities, AFS, Bucks Harbor, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Consolidated Constructors Inc., Portland, Maine, general contractor.

100 tons, or more, addition, medical research laboratory, Yale University, New Haven, Conn., to Joseph T. Ryerson & Son Inc., Boston; Dwight Building Co., Hamden, Conn., general contractor.

REINFORCING BARS PENDING

6300 tons, also unstated for prestressing reinforcement, Washington State Hood Canal floating bridge, 1.341 miles in length; also miscellaneous steel items; bids to Olympia, Wash., Oct. 15.

350 tons, Washington State road projects, Pierce County; bids to Olympia, Wash., Oct. 1.

225 tons, Skagit River bridge approaches, Washington State project; general contract to Louis Elterich Co., Port Angeles, Wash., low at $470,536.

260 tons, two flat slab bridges, Washington State project, Whatcom County; bids to Olympia, Wash., Oct. 1.

150 tons plus, Howard Creek Canal and Little Beaver Creek Dam, Rogue River project, Oregon; Cherf Bros., S. Birch & Sons and D. L. Cheney, Ephrata, Wash., low at $1,285,057, to the Bureau of Reclamation.

PLATES . . .

PLATES PENDING

500 tons, Cougar Dam, Oregon, 1540 ft of 72 and 108-in. plate pipe; J. W. Briggs, Bend, Oreg., is low at $1,527,020 to the U. S. Engineer, Portland, Oreg.

PIPE . . .

CAST IRON PIPE PLACED

500 tons, Portland District improvements to the Pacific States Cast Iron Pipe Co., Portland, Oreg.

CAST IRON PIPE PENDING

2000 tons (estimated) various district improvements; bids soon to Seattle.

STEEL PIPE PLACED

Unstated, 16,600 ft of 10 in., to Armco Drainage & Metal Co., Portland, Oreg., low at $45,835 to Kettle Falls, Wash.

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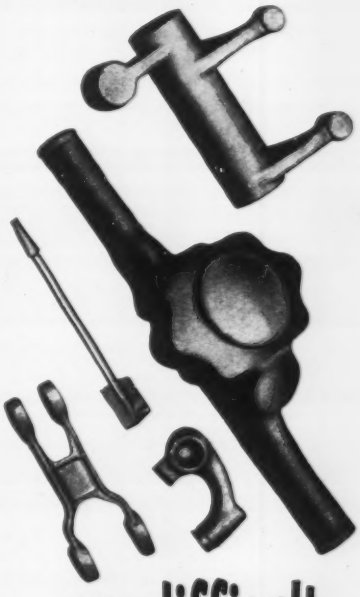

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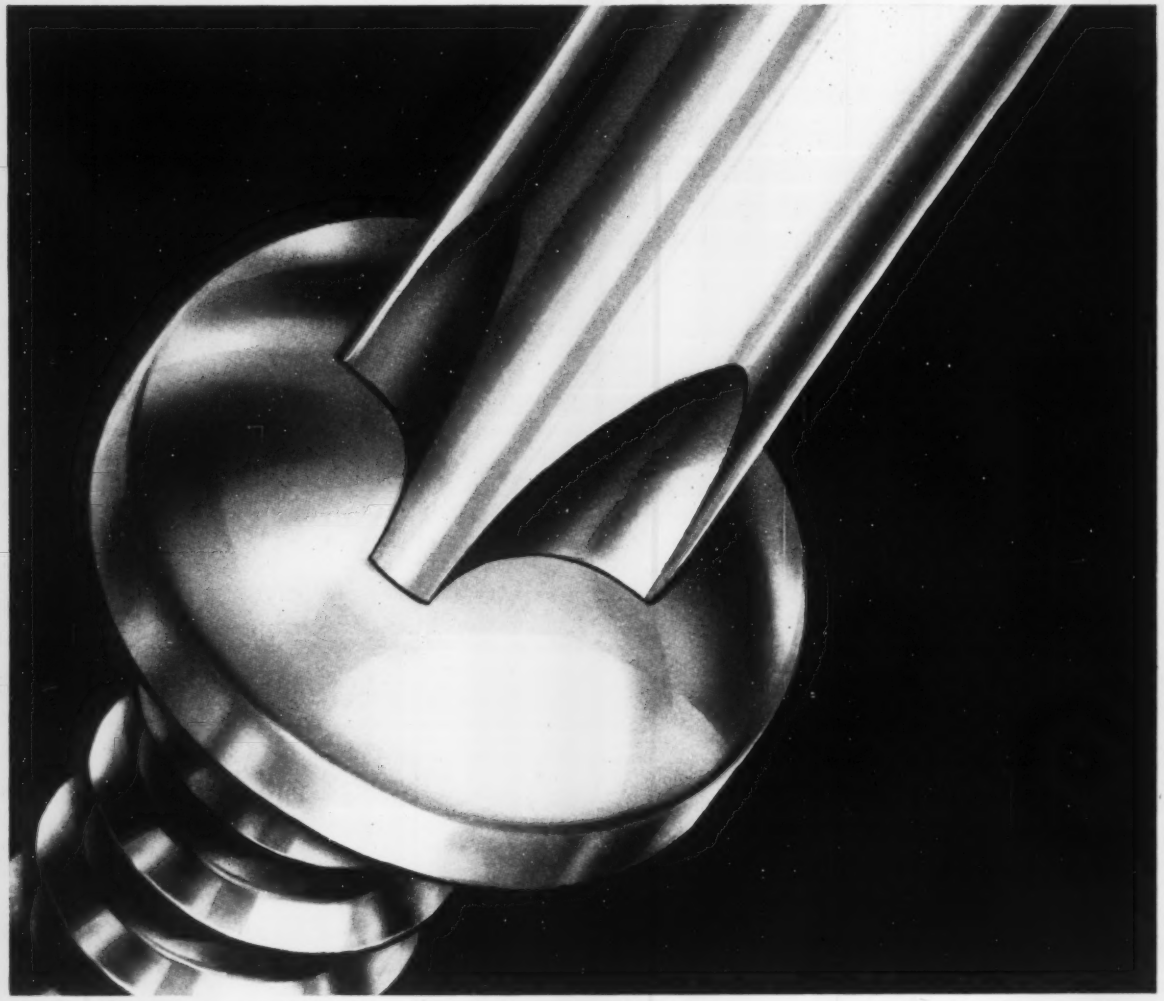

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For companies big or small, American *is* the name for fasteners because we're flexible enough to set up any service schedule that fits *your* need.

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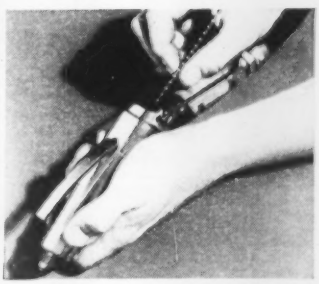
You may find local price differentials from time to time, but nowhere will you get more of all four than from American.

If this sounds unique in the industry, it is.

Make your own comparisons: send us your inquiry for price and delivery or your specifications for special fasteners. And be sure to ask for American's Stock List.

American!



SCREWSTICK, another American development, enables power driving to replace individual handling of hard-to-manage small screws with a cost saving of 4 to 1.

AMERICAN SCREW COMPANY
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developing new equipment ideas for the improved production of ferrous and non-ferrous...

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Mandrel-Type Uncoiler-Leveller for supplying skelp continuously to Continuous Butt Weld Pipe Mills.

Multi-Strand Cold Tube Rolling Mill for production of small diameter tubing.

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Coil handling device for placing coils in either horizontal or vertical position.

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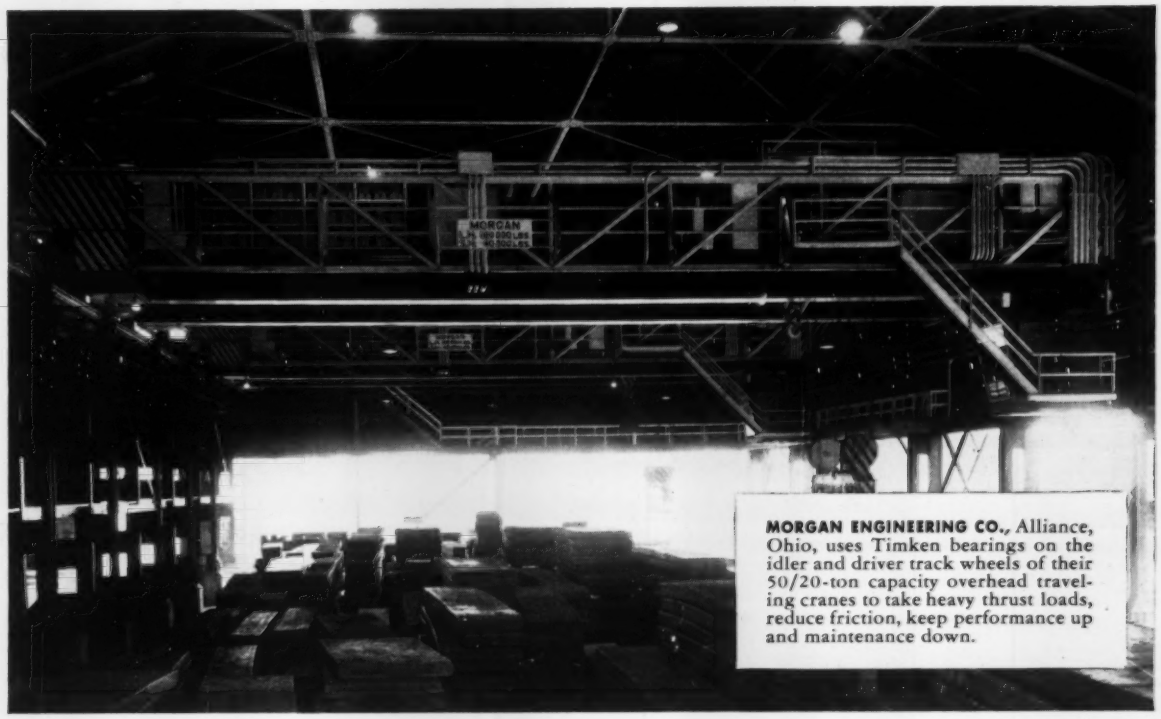

MORGAN ENGINEERING CO., Alliance, Ohio, uses Timken bearings on the idler and driver track wheels of their 50/20-ton capacity overhead traveling cranes to take heavy thrust loads, reduce friction, keep performance up and maintenance down.

Morgan Cranes move hot slabs fast

...TIMKEN® bearings cut traveling costs

THESE Morgan heavy-duty cranes move hot steel slabs from cars to storage in an Eastern steel mill and do it fast. To be sure they keep rolling and at minimum cost, Morgan engineers mounted the idler and driver track wheels on Timken® tapered roller bearings. They keep them on the go with minimum maintenance.

The tapered construction of Timken bearings lets them take *both* radial and thrust loads in any combination. And full line contact between the rollers and races gives Timken bearings *extra* load-carrying capacity. They can take the heavy thrust loads of crane operation in stride. No additional thrust devices are needed. Longer bearing life is assured. Cranes keep rolling.

Timken bearings practically eliminate friction because they are designed by geometrical law to have true rolling motion and are made microscopically accurate to conform to their design. Because friction is reduced wheels and loads roll smoothly. Costly maintenance drops, power is saved.

And by holding housings and shafts concentric, Timken bearings make closures more effective. Dirt and dust stay out; lubricant stays in. Lubricant and upkeep costs are also decreased.

What's more, Timken bearings shrug off shock loads. They're case-carburized to give them hard, wear-resistant surfaces over tough, shock-resistant cores.

Only Timken bearings give you so many advantages. Always specify Timken bearings for the machines you buy or build. Be sure the trademark "Timken" is on every bearing—it's your assurance of full, money-saving value. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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